NORTHROP NEWS

NORTRONICS

VOLUME XXIII

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NORTHROP NEWS

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Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 1 | February 24, 1965

Polaris Work Earns Honors For Ricketts

Nortronics' development and manufacture of missile system checkout equipment for Polaris submarines has earned the Division's director of manufacturing a share of the 1965 John J. Montgomery Project Award.

Made annually to an aerospace or defense project by the National Society of Aerospace Professionals and the San Diego Aerospace Museum, the award this year went to the Polaris Fleet, Ballistic Missile Project.

Nortronics' James M. Ricketts joins a select group of five individual recipients, including three admirals and the president of Lockheed Missiles and Space Co.

Mr. Ricketts was in charge of manufacturing at the Anaheim facility in 1959 when the Navy asked Nortronics to design and deliver a missile checkout unit for the first Polaris submarine.

As a result of the performance, Nortronics received a prime contract for development and production of additional test systems.

Mr. Ricketts shares the award with Rear Admiral I. J. Galantin, director of the Navy's Special Projects Office; Rear Admiral Levering Smith, Special Projects technical director; L. Eugene Root of Lockheed; and Admiral Arleigh Burke (ret.), Chief of Naval Operations when the Polaris project was conceived.

DEFENSE APPROVAL—Deputy Assistant Secretary of Defense George E. Fouch exchanges hearty greeting with an Air Force officer during Zero Defects program inauguration ceremony at Norwood, Mass. With Fouch, who was principal speaker at the event, are Lester Grohe, PPD manager, second from left, and Northrop Vice President Richard R. Nolan.

IRAN RECEIVES FIRST F-5's GOING OVERSEAS

First overseas delivery of Northrop F-5 tactical fighters was completed early this month at Tehran, Iran, in ceremonies attended by U.S. diplomats and military advisors, key officers of the Imperial Iranian Air Force and a Northrop team headed by Chairman and President Thomas V. Jones.

The historic initial delivery consisted of a squadron of 13 supersonic F-5s.

A highlight of the event was the announcement by U.S. Ambassador Julius C. Holmes that this first squadron of Hawthorne-built fighters was the forerunner of a total of seven squadrons that would be delivered to Iran.

"By 1970 there will be almost 100 F-5s guarding Iran's skies," he said.

In praising the F-5 performance, Ambassador Holmes added that Norway, Korea, the Republic of the Philippines, Turkey, Greece, Spain and Nationalist China also will receive the aircraft.

Northrop's Norair Division, which manufactures the aircraft at its Hawthorne facility, developed the F-5 in a three-year program for the Defense Department.

The planes were turned over to Iran as part of a mutual security program.

NORTRONICS BEGINS ZERO DEFECTS PROGRAM AT PPD

Northrop's Zero Defects quality control program was launched at the Nortronics Division Precision Products Department in Norwood, Massachusetts, recently at a ceremony attended by approximately 1200 employees of the facility and spokesmen from local and national government, industry, labor, and military organizations.

Principal speaker at the kickoff event was Deputy Assistant Secretary of Defense George E. Fouch, who spearheads the Defense Department's active encouragement of the "ZD" concept among government contractors.

Purpose of Zero Defects, which emphasizes the prevention of mistakes or errors rather than their detection and cure, is to elevate and maintain over-all performance standards to reduce operating costs while insuring maximum success of military and aerospace missions.

ZD is an employee motivation program dedicated to error-free performance. To stress this, Northrop Nortronics transported its entire Norwood work force to a nearby area where the employees were treated to a buffet luncheon prior to the inauguration ceremonies.

In addition to Secretary Fouch, who heads DOD's Equipment Maintenance and Readiness section, other dignitaries who attended included Alfred Olerio, sub-regional director of the United Automobile, Aircraft, Agricultural Implement Workers of America; Captain A. S. Goodfellow, commander of the Navy's Boston Air Contract Management; Philip N. Bowditch, associate director of the Instrumen-

(See ZERO DEFECTS, Page 6)

NORTHROP NEWS MAKES DEBUT IN THREE EDITIONS

The NORTHROP NEWS makes its debut today.

Intended to provide a medium for communication throughout the large, diversified corporation, the paper will be published in three editions.

Two Hawthorne neighbors, Norair Division and Northrop Space Laboratories, will share one edition.

Nortronics and Ventura Divisions each will be covered in individual editions.

The NORTHROP NEWS will be published biweekly for and by employees of Northrop and will be devoted to providing all employees with information of mutual interest concerning the company.

Charles Bradford, who has been with the company 22 years, has been named editor.

Marketing and Planning Are Strengthened

A number of important changes have taken place over the past few weeks in the functions and responsibilities of key officers and executives of the company in the Beverly Hills offices concerned with developing new marketing opportunities.

A new alignment establishes in the company's headquarters an integrated corporate marketing function under Corporate Vice-president Glenn R. Lord and a corporate forward planning function under Corporate Vice-president Ward B. Dennis, both of whom report directly to the president.

Mr. Jones and other company officers are convinced that the next few years will offer expanding, worldwide opportunities for Northrop, and these moves will strengthen our ability to identify and take full advantage of them.

The program of restructuring these corporate office functions was thoroughly worked out with the division general managers and is designed to produce a hard-hitting, fast-reacting corporate organization that can bring all of the company's resources to bear in the support of each division's planning and marketing efforts.

Broadly speaking, there is no change in the authority and responsibility of the division general

(See CORPORATE, Page 6)

Caramelli Heads Management Club

Frank Caramelli, general supervisor in Contract Estimating, has been elected president of the newly established Nortronics Management Club. Mr. Caramelli joined Northrop at Norair Division in 1952 and has been with Nortronics since June 1960. He has served as program planner in Manufacturing Program Planning and major proposal estimator in Contract Estimating prior to his present assignment.

Caramelli

INTERNATIONAL EXCHANGE—Warm handshakes between Lt. General Mohammad Khatami, commander of the Imperial Iranian Air Force, and Thomas V. Jones, Northrop chairman and president, precedes delivery of F-5 squadron to Iran. Ceremonies this month at Tehran, Iran, marked initial overseas delivery of F-5.

Nortronics Wins $6 Million Pact For Gyroscopes

Contracts totaling more than $6 million for production of auxiliary gyroscopes used in the Minuteman-II inertial guidance system have been awarded to Nortronics Division by North American Aviation's Autonetics Division at Anaheim.

The single-axis, gas bearing gyro will be produced at Precision Products Department in Norwood, Massachusetts.

The auxiliary gyro was developed by PPD specifically for the Minuteman-II ICBM.

Northrop Systems Land on Moon

Packed with numerous Northrop systems, Ranger 8 landed on the moon February 20.

The rocket roared aloft from Cape Kennedy February 17. Its primary mission was to photograph the Sea of Tranquility, a site being considered for landing Apollo astronauts.

A more detailed story on Northrop's participation by Nortronics and NSL in the Ranger program appears on page three of this edition.

Northrop Spans Broad Aerospace Spectrum

Manager of Technologies; Sciences For Free World

If someone should ask what Northrop makes, an employee would be right in telling him—within the limits of security—the name of some products of his job or division. But to be fully correct, something like this should be added:

"We also design and build gyroscopes; accelerometers; sun, earth, and moon sensors; computers; star trackers; missile and aircraft guidance systems; lenses and precision optical and optical/electronic equipment; ordnance and countermeasures devices; electronic checkout equipment; space vehicles; life support systems and equipment; spacecraft recovery systems; target and surveillance drone aircraft; antennas; communications systems; ships' inertial navigation systems; supersonic fighter and trainer airplanes; undersea cable systems; commercial and residential architectural aluminum door frames, window walls, and sunshade control systems."

In addition, the company engages in research and development in many other technologies, ranging from aerodynamics to zero gravity.

The Corporate capabilities brochure puts it this way: "Northrop Corporation is a diversified, systems-oriented company engaged in the research, development and production of advanced scientific and technological products for Free World defense and space programs."

Northrop does this both as a prime systems manager and as a major subcontractor in various national programs.

This is where Northrop draws its distinction. The Company is, in short, a manager of technologies in fields that are in the forefront of national progress and security.

The structure the Company employs to manage its many technologies consists of four divisions, the space laboratories organization, three wholly-owned subsidiaries, and several affiliate companies and joint ventures. The organizations are all solidly built around fundamental technical capabilities, rather than product lines.

Northrop plants and facilities occupy more than five million square feet of floorspace in five states, the District of Columbia and overseas offices are in Paris and Tokyo. The Company currently employs more than 16,000 men and women and has approximately 80 significant programs and projects in work.

Norair: The Largest

Northrop Norair, with headquarters in Hawthorne, California, where the original Company was founded in 1939, is the largest division. It is a specialist organization for manned aircraft, aeronautical systems, and missile airframes and systems.

Among the major products of the division today are the T-38 Talon supersonic jet trainer and the F-5 tactical fighter. Capable of operating from short, unprepared fields in forward battle areas, the F-5A can carry 6200 pounds of bombs, weapons and extra fuel or an equal weight of reconnaissance and surveillance equipment on a variety of missions. Its top speed is approximately 1000 statute mph.

A two-seat version, the F-5B, provides the same weapons delivery capability and has virtually the same performance characteristics. In addition, the F-5B can be utilized for maintaining pilot proficiency, for student pilot and combat training.

More than 500 T-38's are now in service with the Air Training Command with nearly a dozen more being added every month. The T-38 Talon trainer gives student pilots experience in all aspects of supersonic, multi-jet, and high altitude flight in a combat aircraft environment.

In the area of lifting re-entry research vehicles, Northrop Norair has been selected by NASA's Flight Research Center at Edwards Air Force Base to design and fabricate two low-speed lifting-body gliders—designated M-2 and HL-10—for use in investigating problems of piloting advanced spacecraft during re-entry and landing.

Five separate laboratories at Northrop Norair provide research support for studies leading to aircraft and missile concepts of the future. The labs are designed for vehicle flight dynamics, communications and radar, structural dynamics, thermo structures, and vehicle flight controls.

Nortronics: Diversification

Most diversified of all Northrop divisions in terms of products is Northrop Nortronics, headquartered in Palos Verdes, Calif. There also, as well as in Hawthorne, is the division's research laboratories organization. The latter group performs research, development, and production of inertial and astro-inertial guidance and navigation systems, computers, real time information display systems up to theater size, optical tracking systems, star trackers, voice communication and warning systems, space vehicle attitude control systems, air data sensors, and associated electronic components.

Among other products in these areas are the movable "Q-Ball" attitude sensor in the nose of the X-15 rocket research plane, and the fixed version of the air data sensor in the nose of Saturn space boosters. The division also built sun and earth sensors carried on the Mariner past Venus and the guidance and navigation equipment which guided Ranger to the moon.

Nortronics maintains a research and production facility at Anaheim, California, for electronic test and checkout equipment; optical/electronic viewers and equipment; countermeasures devices and ordnance. The Anaheim facility contains equipment that gives it the largest precision lens-grinding capability in the West.

PPD: New Frontier Land

Northrop Nortronics' facilities stretch across the continent to Massachusetts. The Precision Products department in Norwood is one of the foremost producers of precision gyroscopes in the world. As well as building inertial packages for aircraft, missiles, ships, and submarines, it conducts research in such advanced areas as miniature gas spin bearings and radiometry.

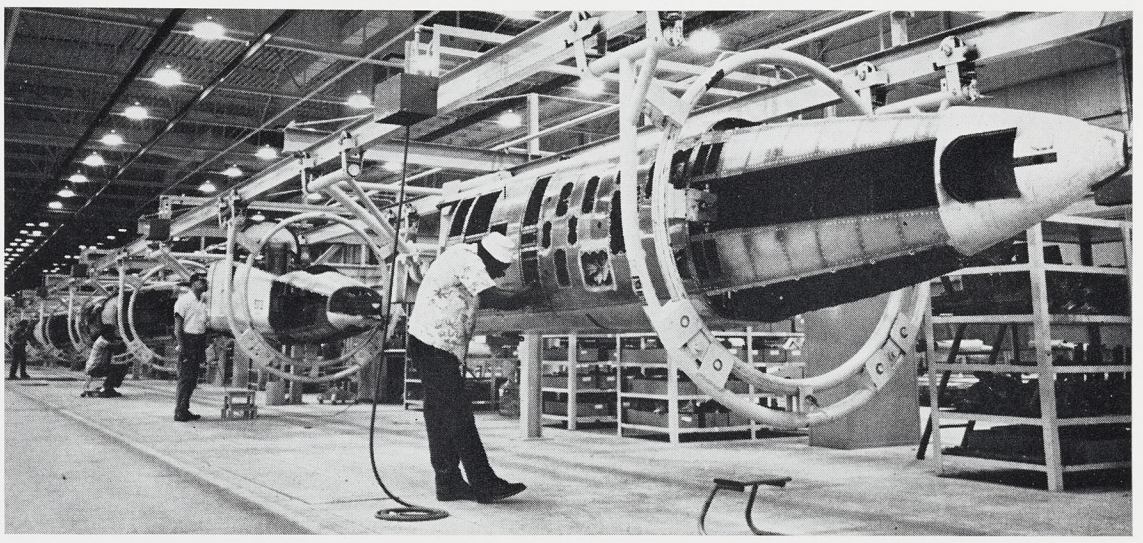
MED: Systems Specialist

Nortronics' Marine Equipment department in Needham Heights, Massachusetts, specializes in control, navigation, stabilizing, communication, and detection systems and equipment for all types of shipboard use. It works on a larger scale in the production of tracking mounts, pedestals, and directors such as the mount it built last year for a 3500-pound laser telescope system for NASA.

Ventura: On Target

Approximately 50 miles northwest of Los Angeles in California's Ventura County, Northrop Ventura is a major producer of

(See CAPABILITIES, Page 5)



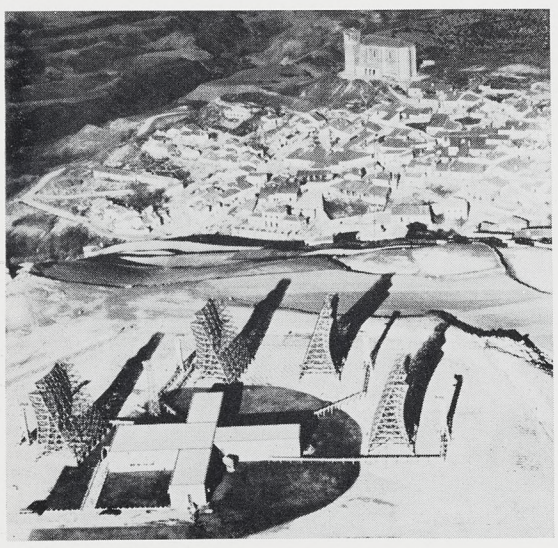
MICE AND MEN

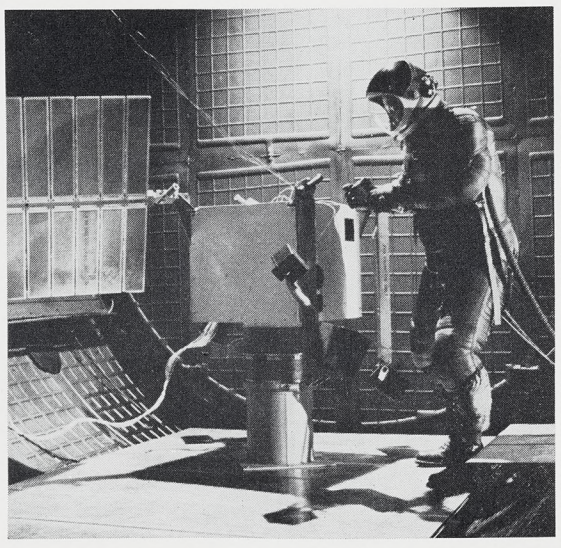
Tiny pocket mice able to withstand huge radiation doses are subjects of biological studies in Life Sciences Division of Northrop Space Laboratories. Unique rail production line (above) for F-5/T-38 assembly at Norair is giant step forward in building man-carrying supersonic aircraft, another Northrop capability.

The Corporate View: Covering 14 Nations

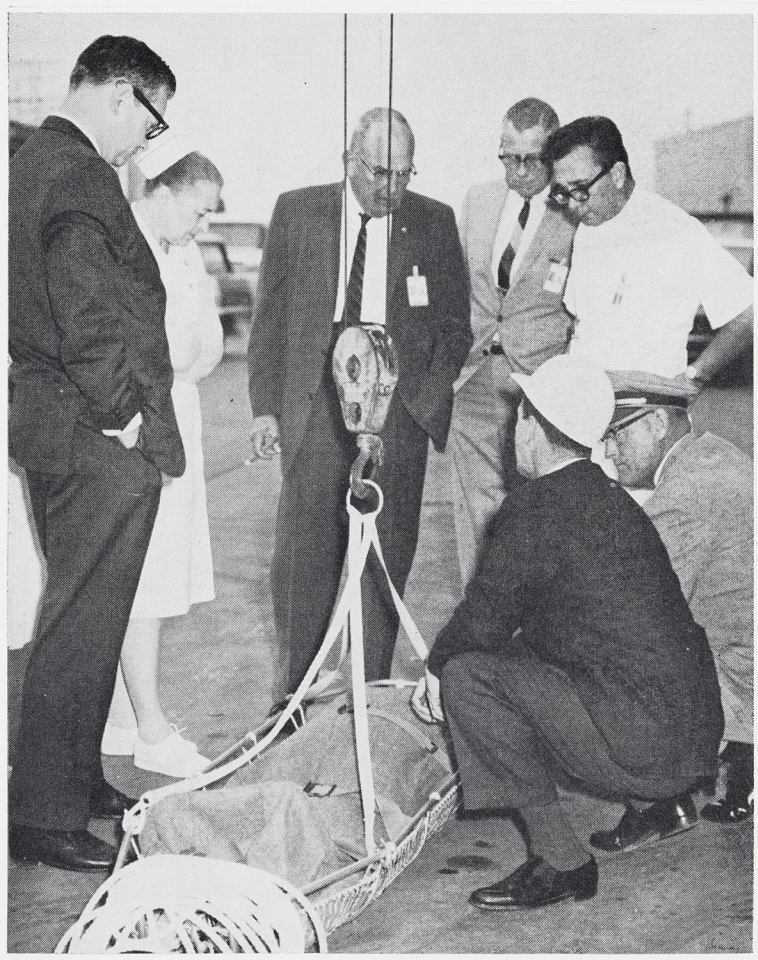
This first issue of the new Northrop News offers a fitting opportunity to tell the story of Northrop as it exists today as one integral corporation.

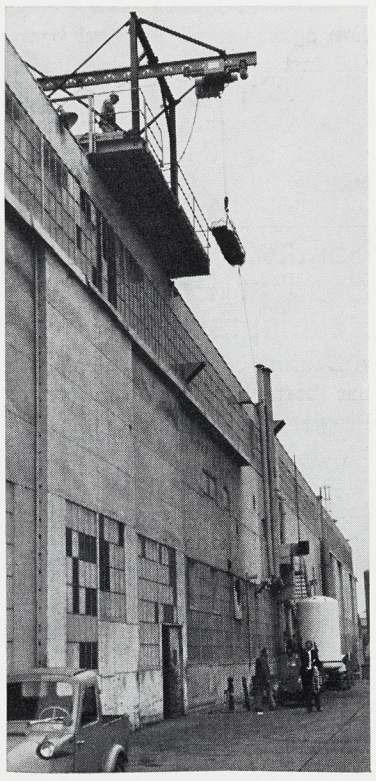
The accompanying story describes the over-all operation of Northrop in its many divisions, departments and facilities in the United States and overseas. Further stories will appear in the Northrop News from time to time to tell in more detail the work of individual Company organizations.





OLD WORLD AND NEW WORLDS—Age is evident in sun-baked buildings at Humosa, Spain, (left) that form backdrop for modern troposcatter antennas designed and built by Page Communications. At Northrop Space Laboratories (right), studies are being made that will enable man to explore new worlds. Chamber simulates space flight and has man-rating provisions.





MOCK RESCUE

Operations demonstrating proper procedures for removing "patients" from inaccessible areas via mobile boom crane were conducted February 10 at Norair Division. Participating were members of the Safety and Fire Prevention branch, Plant Protection branch and the Medical group. Secured in a wire basket stretcher with self-adjusting straps, the "patient" was lowered (right) from the Plant 1 roof while a nylon tag line (above) at the foot prevented basket sway and twist during the descent.

Many 'Made By Northrop' Items Aboard Latest Ranger Vehicle

When the Ranger 8 lunar probe was launched successfully February 17, a number of Northrop employees looked moonward with a personal interest.

The picture taking mission was started on its four-day journey on the first day of a week-long "launch-window," during which the vehicle had to be fired in order to intercept the moon.

Nortronics Division and Northrop Space Laboratories personnel provide industrial support to Jet Propulsion Laboratory on the Ranger program.

From launch vehicle separation until lunar impact, equipment manufactured, tested or integrated by Northrop Nortronics is responsible for keeping the spacecraft on a collision course with the moon. The Division's role in the Ranger program has increased in scope from development and manufacture of a few subassemblies to fabrication, test and integration of complete attitude control systems as well as the central computer and se-[illegible]encer.

Specific hardware currently manufactured for Ranger vehicles by Northrop Nortronics at Palos Verdes Peninsula includes:

Sun sensors, which provide [illegible]gnals for spacecraft attitude control from initial sun acquisition until the mid-course correction maneuver, when inertial sensors take over, following which they again lock the spacecraft on the sun and earth.

Short range earth sensor, activated following sun acquisition to control roll by locking the directional antenna on earth.

Central Computer and Se[illegible]uencer (CC&S), which provides [illegible]mputation and sequencing for critical events such as the mid-course [illegible]neuver and terminal maneuver.

S[illegible]ib Firing Assembly, which trig[illegible]ers the opening of the solar panels [illegible]d acts as the ignition switch to start and stop the mid-course correction motor.

Various control electronic devices, such as the autopilot and sensor switching amplifier, are also manufactured by Nortronics.

Other systems responsibility includes, inertial sensors (gyro and accelerometer modules)—attitude control and mid-course correction velocity information; actuators (directional antenna and jet vane)—earth acquisition and mid-course thrust control; and gas system (regulators, valves, nozzles, etc.)—gas jet "thrust" system.

The Division provides similar systems support and hardware for the Mariner fly-by missions.

Page Communications Busy In Asia, Europe, Bahamas

Page Communications Engineers, Inc. recently completed a radio network in Viet Nam, reached an historic milestone in the Bahamas, and launched a new project in Europe.

The Northrop subsidiary worked seven days a week at times to meet the U.S. Army schedule in South Viet Nam for a special purpose, 50,000 watt system, according to Joe [illegible]rno, project manager.

The station was on [illegible] 56 days after a rice paddy site was selected, two full days ahead of schedule.

Another major step in bringing the Out Islands into direct communications with Nassau and the U.S. was completed with a phone call from The Hon. D[illegible]ld d'Albenas, minister for Out Island Affairs in Abaco to Baham[illegible] Governor Sir Ralph Grey in Nassau.

Page President Joseph A. Waldschmitt attended the ceremony at Marsh Island, Abaco, and presented a commemorative plaque to Mr. d'Albenas.

When completed next spring, the system will link major islands in the Bahamas chain and allow visitors to the famed resorts to keep in telephone contact with the U.S.

The final link will connect Nassau with Exuma Island. It will be the longest of five direct lines in the system, which was begun by Page in early 1964.

In the latest project to get underway, Page's Rome affiliate, Edison-Page, has begun work on a radio network for the U.S. Army in Europe (USAREUR).

The 650-mile link will improve communications for the Army Procurement Center in Germany.

MARCH DATES SET FOR MERIT TESTS

National Merit Scholarship tests for 1966 Northrop awards will be given March 9 and 13.

Children of Northrop employees should make appointments for testing with their high school, according to the University Relations Advisory board.

To qualify for Northrop scholarships, a student must be a U.S. citizen (or in the process of becoming one) and must plan to attend a regionally accredited college in the U.S. and to obtain one of the usual baccalaureate degrees.

Northrop scholars will be selected by the National Merit Scholarship Corporation on the basis of test performance.

Norair Secretaries Attend NSA Dinner

The National Secretaries Association's Airborne Chapter held its 12 annual executive night dinner February 11 at the Sheraton-Marina Hotel, Playa del Rey.

Theme of the banquet was "Around the World Secretaries Wanted," according to Norair Association board members Marianne Weltman, Mayme Colombo, and Marge Stevens.

Miss Weltman is secretary to C. R. "Bob" Gates, manager, Marketing. Mrs. Colombo is secretary to Jack Mannion, manager, Manufacturing / Materiel, and Mrs. Stevens is secretary to Dick Beck, director, Manufacturing Engineering.

Northrop Ventura Hosts Navy CPOs

A group of chief petty officers from North Island Naval Air Station, San Diego, were recent visitors at the laboratories and manufacturing facilities of Ventura Division.

Assigned to Utility Squadron 3, the chiefs are responsible for the largest Navy target drone facility in the world. Many of the drone aircraft used by Squadron 3 are manufactured by Ventura Division.

The chiefs were in Ventura as luncheon guests of the Navy League of Ventura County.

DATA DELUGE PLAGUES MANAGERS, CLUB IS TOLD

The greatest problem faced by management today is the digestion of data, a UCLA professor told the Ventura Division Management Club last month.

Dr. Harold Koontz, professor of management at the UCLA Graduate School of Business Administration, spoke at the Club's dinner meeting January 27 at the Los Robles Country Club, Thousand Oaks.

"We are living in the midst of a deluge of data," Dr. Koontz said, "but we have a dearth of information—that is, information translated and condensed so that a manager can use it."

The UCLA professor is a management consultant, has authored several books on the subject, and has been with the University for 12 years following 10 years of practice in the business world.

"The task of a manager," Dr. Koontz said, "is essentially that of establishing an environment which will make the most effective use of the individual people in a group. Management is not a manipulative thing. As an engineer designs black boxes, the manager must design environment—and keep designing it because the environment changes every day."

The UCLA professor pointed out that whereas there is a high level of research and development in the technical and scientific fields "we need a great increase in R&D relating to management techniques."

Ventura Club Gives $2000 to Colleges

Northrop Ventura's Management Club last month contributed $1000 each to Ventura College (Ventura) and Valley College (Van Nuys), it was announced by M-C President W. F. Green.

The money is to be used at the discretion of the schools to assist deserving students.

The gifts were in addition to two scholarships awarded annually to graduating high school seniors who are children of Ventura Division employees.

OFFICIALLY IN BUSINESS NOW—Nortronics-sponsored Junior Achievement Company was recently presented Charter of Operation at special affair attended by Nortronics executives. At left is Jim Ricketts, director of Manufacturing, with Fred Engbarth, Jeanne Ryker, Jeanne Nault and Paul Gallegos, all leaders in firm called "DESCAL." Youngsters produce and market twin-pen desk sets.

NSL Slates Initial Mock Lunar "Walk"

The first trial "walk" on Northrop Space Laboratories' new five-story high lunar gravity simulator was scheduled to be made today, according to Dr. Walter Kuehnegger, principal investigator on a research program to study man's physical capabilities on the moon.

Suspended at the end of 63-foot cables, human subjects will "stand" perpendicular to a walkway tilted nine and one-half degrees from the vertical. The cables are connected to a dolly and rail arrangement installed at the top of the five-story NSL research building at Hawthorne.

The result simulates the effects of a man moving about on a surface where the pull of gravity is only one-sixth that of earth. Aiding in the simulation is an inclined treadmill hailed by Dr. Kuehnegger as the world's first.

The 12-month contract was awarded by NASA's Langley Research Center, Hampton, Virginia. Most of the work will be done by the Life Sciences section of NSL's Research department at Hawthorne.

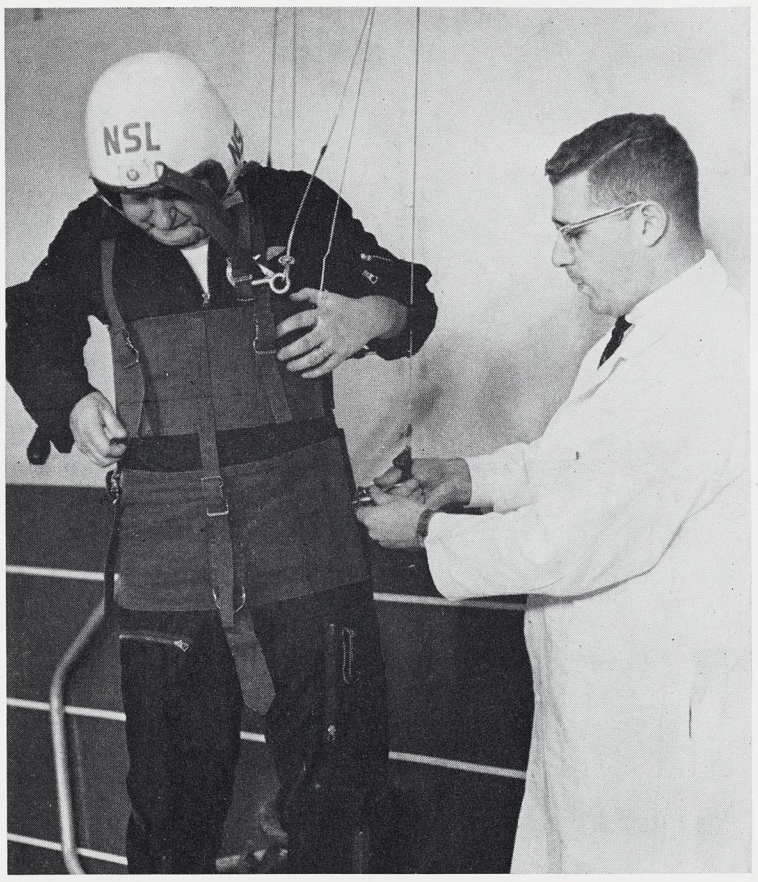
Case Institute of Technology at Cleveland, Ohio, is associated with the project as a subcontractor.

"One of the most important determinations in the program will be how long a man can remain on particular missions on the moon with the life support equipment he can carry with him," Dr. Kuehnegger said. "This information will be obtained by investigating the energy requirements of man while performing given activities in a pressure suit under various pressure levels at one-sixth gravity.

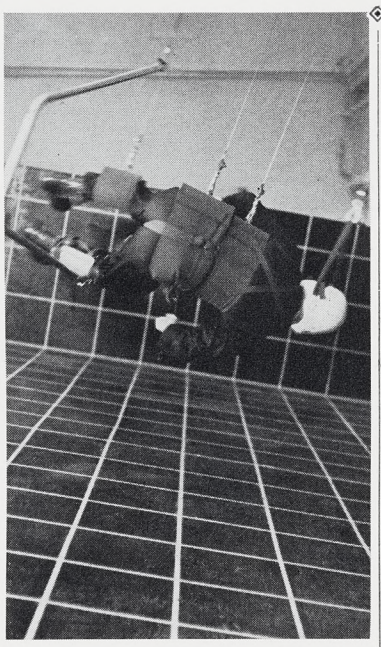
"Conclusions may then be drawn as to the over-all amount of oxygen, the amount of carbon dioxide-absorbing chemicals, and the cooling provisions that must be supplied in his back pack for the man to complete given work assignments," he said.

Experiments will be performed by subjects both in and out of the pressurized suits that man must wear on the moon. Unsuited performance will provide base line data from which to measure further results.

A smaller lunar gravitational simulator has been in use for familiarization by NSL scientists for some time.



MOON WALKER—Dr. Walter Kuehnegger of NSL's Life Sciences section, above, dons lunar gravity simulator harness with aid of Engineer Frank Rizzo. Below he is shown in middle of a somersault begun from a "standing" position against nearly vertical board at far right. Device, an experimental test model inside NSL high bay area, simulates lunar gravity, one-sixth that of earth. Dr. Kuehnegger will head work under NASA contract to study man's physical capabilities on moon, for which new simulator has been built alongside five-story research building.



VENTURA ASTIR AS PECK FILMS SCENE AT PLANT

When Gregory Peck appeared under the olive tree in front of the Ventura Division plant, a number of secretaries had to stifle the urge to abandon their desks for a closer look.

Universal Pictures was granted permission by Corporate Vice-president and Division General Manager George Douglas to use Northrop's Conejo Valley plant as a backdrop for scenes in the forthcoming movie, "Mirage."

Actor Peck, with full entourage of Hollywood equipment, completed the scenes in two hours.

In return for the Northrop courtesy, Universal donated $200 to the Ventura School for Girls at Camarillo in the name of Ventura Division employees.

Grogan Transfers To Marketing

George C. Grogan, former project director of the Supersonic Transport Advanced program, is now assistant manager, Marketing, at Northrop Norair, reporting to Marketing Manager C. R. "Bob" Gates.

Mr. Grogan joined Norair in 1959. He was chief, Aero and Propulsion Sciences, and was project director on the Northrop/Hawker Siddeley P.1127 before his most recent assignment. He holds degrees from the University of Oklahoma and Massachusetts Institute of Technology.

EEK! A SPACE MOUSE—Venice High School science teacher, Mrs. Joy Lauffenburger, reverses usual feminine reaction and shows no fear of "huge" mouse used in space research by NSL radiation biologist Dr. Jerome Gamino. Magnified in laboratory viewing lens, creature is Perognathus longimembris who looms large among mammals when measured in terms of tolerance to radiation.

NORTRONICS MAN BELONGS TO TWO SCHOOL BOARDS

Don Weaver, Precision Manufacturing general foreman, at Nortronics Special Projects section may be one of the first men to serve on two school boards at the same time.

Mr. Weaver missed most of the Lawndale Elementary School District board meeting February 9 because he was being sworn in as a trustee of the Centinela Valley Union High School District.

Elected to the Lawndale board, he was appointed to the other following the resignation of another trustee.

Mr. Weaver said he would remain a trustee of the elementary district board until a smooth transition could be worked out with other board members.

He said he would run for election to a full term on the Centinela District board. Elections for both boards will be April 20.

Mr. Weaver has been with Northrop since 1951.

Gustavson Named Head of Program Development

Danish - born John Gustavson has been appointed director of Program Development at Northrop Space Laboratories, it was announced this month by Roy Jackson, vice-president and assistant general manager.

Mr. Gustavson brings to Northrop an established reputation in aeronautical engineering and rocket propellants.

His principal duties at the Hawthorne facility are evaluation and implementation of efforts required to improve NSL skill and technology.

An associate fellow in the American Institute of Aeronautics and Astronautics (AIAA), Mr. Gustavson was founding president of the Arrowhead Section and is currently vice-chairman of the Los Angeles Section.

Las Vegas Outing Set for Travelers

Final call for all fans of legalized gambling and fabulous shows (a la Las Vegas) was sounded this week by the Northrop Interdivisional Travel Club.

Dates for the group excursion are March 19 - 21. However, a $15 deposit (total price, $34.65) must be made at Personnel Activities offices throughout Northrop organizations no later than Friday, February 26.

Club Elects Officers

The Antelope Valley Northrop Recreation Club Palmdale - Edwards has elected new officers for the coming year, it has been announced.

The officers are: Chuck Smith, recreation chairman, Palmdale; Fred Burns, vice-chairman, Palmdale; Daphine Abrams, secretary, Edwards; and Claude Gorham, social events chairman, Edwards.

Wierk Named Head of Data Processing

Paul Wierk, formerly director of Technical Administration at Northrop Norair, has been appointed corporate director of Management Information.

In his new assignment, Mr. Wierk will report to Richard R. Nolan, vice president-Manufacturing and Administration, and will be responsible for all machine data processing and computing services within the company.

Mr. Wierk joined Northrop in 1953. He will be located in the company headquarters in Beverly Hills. He replaces Milton Stone, who has resigned.

Oliver Discusses Product Licensing

Finding new products and generating new business through product licensing was described February 4 for the Strategic Industries Association of Los Angeles by Northrop's John E. Oliver.

In addition to being Corporate administrator, Product Licensing, for Northrop, Mr. Oliver is chairman of the Licensing committee of the Los Angeles Chamber of Commerce.

Quality Conference Hears E. C. Bennett

Norair's E. C. Bennett, chief of Quality Control Engineering, last month addressed the 8th annual Cal-Poly Conference of the San Bernardino Section of the American Society for Quality Control (ASQC).

Mr. Bennett was one of 25 quality experts representing industry and government agencies. He is a founding member and Fellow of the ASQC.

R. S. Catlin, manager of Norair Quality Control, was a session chairman at the conference.

Going my way?

Going My Way forms, 59-228, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Torrance Blvd. & Hickory, Torrance. Lela Love, ext. 2133, 1834, 329-3513. 2

164th St. & Inglewood Ave., Redondo Beach. Harriet Chaney, ext. 2170, 2133, FR 2-6082. 2

7:30 a.m. — 4:15 p.m.

Sepulveda Blvd. & 237th Pl., Torrance. Maxine Farberg, ext. 1458, 674-3359. 3

Century & Felton, Inglewood. L. G. Burgess, ext. 1204, 672-0203. 3

8 a.m. — 4:45 p.m.

Olympic & Santa Monica Blvd., Los Angeles. Kay Johnson, ext. 2611, 474-9633. 5

Lemoli & Compton Blvd., Gardena. Margo Campbell, ext. 1481, 676-5505. 5

Beverly Glen Blvd. & Santa Monica Blvd., Los Angeles. J. W. Murphy, GR 4-3433. 5

Crenshaw & 116th, Inglewood. John W. O'Hara, ext. 1771, PL 5-6061. 5

Classified

To place an ad in the Northrop News, obtain classified ad form 59-308 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Violin, full size, $250. P.V. Estates, 378-7778. A

Dodge carryall, ¾-ton 4 x 4 military, many new parts & extras, $950. Redondo Bch., FR 5-4910. A

Bar, 8′, mahogany, 4 stools, $60. Gardena, 320-5014. A

Ford, 1954 conv., 292 cu. in. eng., floor shift, $275. L.A. 44, 755-7093. A

Bicycle, boy's 26″ lightweight, coaster brake, $15. Inglewood, FA 8-3306. A

Shotgun, Winchester, 16 ga., full choke, repeater pump, $45. Inglewood, 755-8104. A

Nova II special sport cpe., 1963, auto. trans., $1700. Hermosa Bch., FR 4-5217. A

Bicycle, girl's 16″ w/training wheels, $10. Inglewood, PL 5-4497. A

Sofa, custom-made, green & gold, contemporary, $75. Inglewood, 751-0509. A

Stereo Hi-Fi components, AM/FM tuner, stereo turntable, dual amplifiers, dual preamps, & cross-overs, 4 speakers, $66. Hawthorne, 676-0418. A

Pups, boxer, pedigree, females, $30-$50, males, $60-$70. Hawthorne, OS 6-9968. A

Stove, custom-made, $10. Gardena, 329-9484. A

Tricycle, $4. P.V. Estates, FR 5-5097. A

Chevrolet, 1956 sedan, Hydromatic, $400. Long Beach, GA 3-1363. A

Lawn Edger-trimmer, electric, $10. P.V. Pen., 377-5319. A

Stove, O'Keefe & Merritt, 4-burner, grill, $30. L.A. 44, PL 7-4305. A

Shotgun, Remington auto., model 11, 2 chokes, recoil pad, leather case, 12 ga., $100. Pac. Palisades, 454-2057. A

Range, apartment-size, gas, $25. Hawthorne, 675-1031. A

TV, Packard-Bell early American, 21″, $25. Inglewood, EX 8-8805. A

Refrigerator, 7.3 cu. ft. Coldspot, $50. Torrance, DA 5-3724. A

Bar Stools, 2, $10. Hawthorne, OS 5-3423. A

Camera, Minolta SR-1 & case, $110. Inglewood, 671-9269. A

Rifle, Marlin auto., 22 cal. w/scope & case, $40. Redondo Bch., 371-8907. A

Bicycle, girl's 24″, Schwinn Hollywood, $20. Redondo Bch., FR 2-3827. A

Pickup, 1964 Chev. ½-ton, low milage, custom cab, all extras, $1875. Hawthorne, OR 5-4905. A

Rambler, 1957 4-dr., sedan, r/h, w/w, $400. Gardena, 323-6074. A

Golf Clubs & bag, women's, $65. Inglewood, 674-4192. A

Washer, Kenmore, $125. Hawthorne, OS 5-1057. A

VW Sedan, 1957, good tires, $300 dn., $31.65 mo., $799. Torrance, DA 3-4257. A

House, Rolling Hills, 3-bdrm., 2-bath, GE kitchen, patio, fireplace, landscaped, fruit trees, near schools, newly dec., 1600 sq. ft., $42,750. Rolling Hills, 833-9747. A

Range, elec., Frigidaire, compl. w/deep well cooker, $30. Downey, 923-9957. A

Outboard motor, 15-hp, Evinrude, operated 2 seasons, $85. San Pedro, TE 1-9545. A

Cabin Cruiser, Catamaran, 20′, 8′ beam, self-bailing transom, 2 50-hp Evinrude motors w/generator, 2 40-gal. built-in tanks; 2 6-gal. portable tanks, many extras, $2400. Torrance, DA 4-0341. A

Desk & chair, child's, maple, $15. LA., PL 7-4705. A

Washer-dryer comb., Kenmore, $100. El Segundo, EA 2-0678. A

Chrysler, 1951, 3-spd. factory stick, traction masters, $1400. L.A. 44, PL 7-5455. A

Buick Special, 1954, 4-dr. sedan, stick shift, 49,800 miles, r/h, new w/w tires, battery, clutch, $175. P.V. Pen., FR 7-7489. A

Buick Special, 1955, good tires & engine, $200. Box 101. A

Mercury, station wagon, 1948, woodie, 2 mag rims, $250. Box 102. A

Cadillac coupe de ville, 1964, full power, 9000 miles, $4700. Manhattan Bch., FR 6-9173. A

Sunbeam, 1962, low mileage, $1350. Beverly Hills, CR 6-4879. A

Range, Kenmore elec., pushbutton, rotisserie, other extras, $165. Gardena, OS 6-7316. A

Thunderbird, 1958, $895. Redondo Bch., 376-8545. A

Stove, gas, white, Magic Chef, $40. Inglewood, PL 8-5039. A

Impala, 1961, 2-dr., W-3 eng., factory air cond., all extras, $1450. Northridge, 345-9962. A

For Sale

Range, O'Keefe & Merritt, narrow width, $50. Gardena, 327-2279. A

Revolver, 22, Hy Hunter Frontier 6-shooter model, $50. Malibu, 479-3183. A

Acreage, in San Diego County, 1-9 acres, reasonable terms, $2000-$4000 an acre. Hawthorne, 676-5253. A

Ford 500 Fairlane, 1961, 4-dr., p/s, auto. trans., $1050. Hawthorne, 679-1992, EX 6-5797. A

Sofa, matching chair set, custom-made Provincial, dk. brown, used 1-yr., $240. Redondo Bch., 371-3294. A

Plymouth, 1957, 4-dr., sedan, $200. Gardena, DA 4-3542. A

Triumph, Tiger Cub, 1964, scrambler 200 cc, $600. Gardena, 329-9353. A

Bedroom Set, 3-pc., modern, blond, $100. Inglewood, 672-0295. A

Skis, 6′9″ Fischer Pioneer w/Eckel safety bindings, $30. P.V. Estates, FR 5-0867. A

Home, 3-bdrm. w/family room, 2 baths, existing G.I. loan, pay $110 P & I w/$6000 dn. or 90% conventional loan, $29,500. Torrance, FR 1-2526. A

Home, 3-bdrm., Hawthorne, corner lot, lge. backyard, $19,500. Hawthorne, OS 9-3008. A

Camera, 8mm movie, mag. load, Dejur Fadematic, turret model, 13mm f:1.9 & 36mm f:2.8, GE exposure meter & type A filter, $50. Box 103. A

House trailer, 1958 Lakewood 15′, spare tire & wheel, jacks, 1965 lic., $650. Lakewood, KE 5-8063. A

House, 3-bdrm., family room, 1½-bath, covered patio, dble. detached gar., large lot, 2½ mi. to Northrop, call for appt., $23,750. Gardena, DA 3-6884. A

Accordion, 120-bass, w/case, $10. Venice, EX 1-2040. A

Buick, Roadmaster, 1957, $295. L.A., 756-0068. A

Student desk, 18″ x 36″, 4-drwrs., $10. Rolling Hills, FR 5-8778. A

Bicycle, Sting Ray, front-hand brake, $30. P.V. Pen., FR 8-2810. A

Outboard, 12, 7½-5-hp comb., 6-gal. tank & cart, $125. Inglewood, 671-8368. A

Ford Galaxie 500 club coupe, 1959, r/h, w/w, auto. trans., $700. Los Alamitos, 430-4407. A

Table w/4 padded chairs, Virtue Bros., extra leaf, cherry wood, $40. Inglewood, 671-4986. A

Austin Healey Sprite MK II, 1962, $995. Hermosa Bch., 379-7567. A

Alfa Romeo Spyder, 1962, 28,000 orig. miles, r/h, seat belts, spare tire, tools & handbook, $1300. Lynwood, 635-3784. A

Chevrolet, 1957 4-dr. V-8, auto. trans., p/b, $595. Hawthorne, 676-6786. A

Talking Mina bird, w/2 cages, $50. Inglewood, OR 1-1660. A

Silver Dollars, uncirculated, in plastic tubes, $26 roll. Box 104. A

Home, 3-bdrm., Culver City schools, many features, $26,950. L.A., UP 1-0999, EX 1-4106. A

Morris Minor, 1959, rebuilt eng., $300. Lawndale, 675-4992. A

Pups, Pom., AKC reg., champ background, 1 male, 1 female, $85. Hawthorne, 676-9670. A

Honda 50, C100, $150. L.A., 645-7635. A

Corvair Monza 900, 1961, new valves, shocks, brakes & paint, $1100. Gardena, 323-3424. A

Pontiac, 1957, take over $28 mo. pymts., $418 bal. Box 105. A

Coffee & tea service, 5-pc. silver, in orig. crate, $175. Inglewood, OS 6-1475. A

Washer, wringer type, Easy, $15. Hollydale, ME 3-2395. A

Plymouth Fury, 1960 4-dr., 1 owner, $650. Garden Grove, (714) 892-7440. A

Winch, 12-volt boat-trailer, $60. Torrance, 371-9921. A

Cocktail Dress, size 12, full length, empire-style, marlin blue crepe, $25. Gardena, DA 3-3245. A

House, 3-bdrm., 1-1/3 bath, landscaped, 20x40 pool, view of San Pedro Harbor, ½ acre, $41,500. San Pedro, TE 3-9455. A

Ford, 1961 conv., r/h, new top & tires, $975. Lomita, NE 1-9573. A

Plymouth Belvedere, 1964 2-dr. h/top, 426 S eng., 4-spd. trans., r/h, $2500. Lomita, DA 6-6214. A

Ford, 1957 station wagon, Country sedan, 9-pass., r/h, w/w, auto. trans., $325. L.A. 47, PL 6-0015. A

Motorcycle, 1964 Triumph Bonneville, $925. Manhattan Bch., 372-4951. A

Pontiac, 1958 2-dr., big eng., stick shift, chrome wheels, $700. Redondo Bch., FR 6-7269. A

Tire & wheel, 5.30/4.50-12 for Fiat, $10. Hawthorne, OS 5-2081. A

Dog, Chihuahua, fawn & white, 1-yr.-old, female, reg., $50. Redondo Bch., FR 8-1658. A

Yamaha, 1964 250-ydi, 900 mi., $550. Hawthorne, 676-1471. A

TV, 16″ RCA, cabinet, $14.95. Torrance, 835-1031. A

Range, gas, O'Keefe & Merritt, $40. L.A. 8, AX 5-5813. A

Volkswagen, 1964 sedan, 12,000 mi., $1695. Inglewood, PL 6-7337. A

Airplane, home-built, partially completed, 2-place Doodle-Bug, drawings, Lycoming 0-290-G eng., other misc. parts, $300. Redondo Bch., FR 4-2915.

Breakfront, lge., mahogany, $150. Hawthorne, 676-0787. A

For Sale

Volkswagen, 1960, r/h, 1965 license, $995. Torrance, FA 8-7644. A

Buick, 1958 Super Riviera, full power, $425. Pasadena, 796-4473. A

Ford, Starliner, 1960, 2-dr. h/top, p/s, r/h, $50 & take over pymts., $650 bal. Gardena, 679-3927. A

Range, Kenmore, gas, $25. Hawthorne, OS 5-1860. A

Volkswagen, 1960 sed., radio, $875. Inglewood, 675-3563. A

Corvair, 1962 4-dr. sed., r/h, low mileage, $795. Rolling Hills, FR 5-7564. A

Home, 3-bdrm. & family room, 2-bath, fireplace, 1550 sq. ft., West Canoga Park, $24,500. Los Alamitos, 430-7721. A

Roto-Tiller, 4-hp, $95. Torrance, FR 1-2948. A

Stereo Phono, Decca portable, $35. L.A. 25, 478-5732. A

Television, 21″ Capehart w/maple cabinet, $20. Manhattan Bch., FR 4-0021, FR 9-6451. A

Go-Kart, mag. front wheels, chain drive Power Product eng., $80. Inglewood, PL 6-7681. A

Range, Philco, elec., $65. Gardena, GA 2-7988. A

Sectional, 4-pc. hand quilted, foam cushions, wing back Early American, $450. Pacoima, 882-0761. A

Camper, 1961 turnpike 8′ cab over, $800. Inglewood, 632-9377. A

Corvair, 1961 700 deluxe, 4-dr., auto trans., r/h, $750. Miraleste, TE 1-4586. A

Cadillac cpe., 1960 full pwr., orig. owner, $1850. P.V. Estates, 378-8953. A

Chevrolet, 1962, Biscayne, r/h, 4-dr., stick, $1150. Huntington Beach, (714) 962-3834. A

Chevrolet, 1956 2-dr., rev. chromes, $395. Hawthorne, 676-6324. A

Pups, German shepherd, 8-wks.-old, $5. Fullerton, 529-4788. A

Dot Scrambler, 1964, $575. Manhattan Bch., FR 4-3365. A

Barber Set, Sears Roebuck Craftsman, used 3 times, $7. Hawthorne, OS 5-7088. A

Rambler American 330, 1964, 4-dr., auto., r/h, $350 plus $66 mo. for 21 mos., approx. $1700 bal. Hawthorne, 679-0556. A

Lumber Rack, w/rigging levers for ¾-ton truck, $70. San Pedro, 370-2023. A

Pontiac Catalina Vista, 1959, 4-dr. h/top, r/h, auto. trans., $750. Bellflower, 867-5892. A

Bed, ¾ rollaway type, w/mattress, $30. Hawthorne, OS 6-8789. A

Wanted to Buy

Power mower, reasonable price. Torrance, 371-3471. B

Light Camper for 8′ Chevrolet Fleetside. Downey, TO 7-0593. B

Surfboard, boy's, for age 14, reasonable price. Inglewood, 371-9730. B

Travel Trailer, 21′-23′, s/c, late model w/twin beds. Inglewood, OR 1-2058. B

Baby Furniture, good condition. S. Monica, EX 3-5421. B

Lamp, Calif. Dri-Aire. Torrance, FR 2-7270. B

For Trade

Bedroom Set, matched, for den furniture. Hawthorne, OS 9-6982. C

Reducing Couch, Stauffer, trade for refrig. w/crosstop freezer. Manhattan Bch., FR 2-4980. C

Rentals Offered

Apt, 1-2 bdrms., furn. or unfurn., sound proof, carports, lease opt., close to fwys., pool, $125 & up. N. Hollywood, 762-4310. E

Apt, 2-3 bdrm., near Northrop, 1½-baths, carport, patio, children OK, s/p walls, $120 & $145. Los Alamitos, 679-7551. E

House, 3-bdrm., fenced yard, 5 miles to Northrop, $135 mo. Redondo Bch., FR 9-9786. E

Apt, 2-bdrm., unfurn., garage, $87.50. Box 106. E

Apt, bachelor, furn., $55 mo. Inglewood, OS 6-2162. E

House, 2-bdrm., fenced yard, $90 mo. Lawndale, OS 5-9695. E

Apt, for lease, Palms area, 1-2 bdrm., patios, near schools, $105-$150. Beverly Hills, CR 1-9818. E

Mountain Cabin, Green Valley Lake, weekend, $35;week, $65. Gardena, 324-5961. E

Apt, 2-bdrm., furn., carport, lge. closets, close to Northrop, util. pd., $125. San Pedro, TE 3-2512. E

Apt, 1-bdrm. & den, unfurn., 2 miles from Northrop, $95. Inglewood, OR 2-0304. E

Apt, 3-bdrm., furn. or unfurn., pvt. gar. avail., $130-$115 mo. Eastview, 422-4022. E

Studio Apt, 2-bdrm., 1½ bath, 1 block to Northrop, $130. mo. Hawthorne, 676-6134. E

Apt, 2-bdrm., 2-bath, gar., Redondo, $130 mo. on yr. lease. Redondo Bch., FR 2-0448. E

Apt, 2-bdrm., unfurn., fireplace, 2 baths, laundry facil., ½ mile to Norair, $140 mo. Hawthorne, 679-1358. E

House, 2-bdrm., unfurn., children, no pets, walking distance to Norair, $100 mo. Box 107. E

Rooms, elec. heat, laundry facil., $12.50-$15 wk. Lawndale, 371-6775. E

TAC GENERAL FLIES F-5B—Maj. Gen. John C. Meyer, commander of the Tactical Air Command's 12th Air Force, enters front cockpit of an F-5B preparatory to his familiarization flight at James Connally AFB, Tex. Northrop Norair Pilot Bill Morse is at right.

CAPABILITIES: Spanning The Aerospace Spectrum

(Continued from Page 2)

radio-controlled target, surveillance, and logistics drone aircraft.

Northrop Ventura has become a leader in the design and production of advanced landing systems for the recovery of America's astronauts and space vehicles from orbital and lunar flight. The division supplied the parachute recovery system for all Project Mercury spacecraft and is doing the same on Project Gemini.

Current operational drones include the rocket-powered supersonic RP-76 and its Navy counterpart, the RP-78; the OQ-19 (Navy KD2R-5) propeller-driven target, and the MQM-75A.

Another facility, Aero Instruments of North Hollywood, California, designs and markets various special meters, switches, and electro-mechanical devices.

The company's activities in space technology are advanced by Northrop Space Laboratories, located primarily at Hawthorne, California. NSL concentrates on the design, development, and manufacture of space vehicles and systems, and research in life and physical sciences. A facility in Huntsville, Alabama supplies direct engineering support to NASA's Marshall Space Flight Center.

Man's survivability in space is the ultimate objective of NSL experiments in Life Sciences and Physical Sciences. This work involves many scientific areas, including biology, biodynamics, behavioral sciences, nuclear energy and radiation, plasma physics, chemistry, and geology.

From its headquarters in Beverly Hills, Northrop International —the company's global representative — manages Northrop's overseas marketing interests.

Also active on a world-wide scale is the wholly-owned Northrop subsidiary, Page Communications Engineers, Inc. Although its headquarters are in Washington, D.C., Northrop Page performs design, construction, operation, and maintenance of advanced communications systems and installations that leap across national boundaries and oceans all over the globe.

The subsidiary recently completed the first nationwide military communications network in South Vietnam, and a voice and teletype system for the U. S. Strategic Air Command between England, Spain, and Morocco.

In another area of global communications, Northrop shares ownership of the United States Underseas Cable Corporation of New York City.

The company specializes in the manufacture of underseas cables and equipment; cable laying, and surveying.

Working entirely in the commercial or nonmilitary field are the important wholly-owned subsidiaries, Northrop Architectural Systems and Pacific Curtainwall, Inc., with headquarters in Los Angeles. These organizations combine to offer a systems approach to architectural development, providing architect, contractor, and client with a wide choice of known quality products in architectural aluminum and other metals.

Rentals Offered

Apt, 1-bdrm., service porch, gar., patio, Hawthorne Blvd. & El Segundo area, $90 mo. Manhattan Bch., FR 6-2122. E

Apt., 1-bdrm., lge. closets, tile bath, $95 mo. Redondo Bch., 376-2117. E

Rentals Wanted

Apt, 1-bdrm., unfurn., w/stove & refrig., near Northrop or El Camino Col., no children, would lease, $75 mo. approx. Hawthorne, OS 9-3978.

Lost

Textbook, Pestel, Regelungstechnik German, lost & found, Norair, ext. 1972. P.V. Estates, 378-5344. J

Personals

USS Lexington CV-2 Minuteman's Club will hold its 11th annual reunion June 24-27 in Long Beach. Crew members 1927 through 8 May 1942, attached to air squadron or served aboard in any capacity are invited. Hawthorne, OS 5-0563. L

Your kind expression of sympathy is gratefully acknowledged & deeply appreciated. **Frank Perugini & Family.** L

For Sale or Trade

Bicycle, boy's 26″, 3-spd., light weight, Royce Union, $15 or trade for 8mm movie projector. Canoga Pk., 348-3100. M

Chevrolet, ¾-ton, 1963, many extras, sleeper camper, $1900 or trade my equity for older car or truck. Box 108. M

NSL Satellite To Test Space Environment

Environmental tests of the OV2-1 space environmental sensing satellite were under way at Northrop Space Laboratories last week as the vehicle continued its test program preparatory to delivery to Cape Kennedy, Florida.

The OV2-1 (Orbiting Vehicle Two, Article One) was developed and built by NSL for the U.S. Air Force Office of Aerospace Research. The satellite will carry sensing instrumentation for 14 space environment experiments for which it is to collect and transmit derived data for a period of one year in orbit.

It is scheduled for delivery to the Office of Aerospace Research, Patrick Air Force Base, Cape Kennedy, where it will be installed as a bonus payload on the development launch of the Titan III-A late this spring. The primary objective of the Titan flight will be to test complete system performance of Titan III-A. By placing the OV2-1 aboard Titan III-A, valuable scientific data may be obtained by the Air Force

On reaching a predetermined point in space, the OV2-1 will be separated from the Titan III inert flight test payload and powered into an elliptical orbit.

M.I.T. VISITOR—Tom Harrington, second from left, placement director of Massachusetts Institute of Technology, shares a laugh with Ross Miller, right, vice-president and manager, Technical Dept.; Lloyd Balsam, Miller's assistant; and George Richards, left, supervisor, Personnel Administration. Purpose of Harrington's visit to Nortronics was to become acquainted with Northrop activities and product lines. He also toured NSL and Norair Division.

ZERO DEFECTS: Solving Errors by Prevention

(Continued from Page 1)

tation Laboratory at MIT; Massachusetts State Representative William F. Butters; Irving Kessler, vice-president and general manager of the Aerospace Systems Division of the Radio Corporation of America; and Thomas K. McManus, chairman of the Norwood Board of Selectmen.

Representing Northrop Corporation headquarters in Los Angeles was Richard R. Nolan, vice-president, Manufacturing and Administration; and Frederick Stevens, vice-president and general manager, Nortronics Division.

According to Lester R. Grohe, Nortronics vice-president and manager of Precision Products Department, the appearance of Secretary Fouch, who flew direct from Washington for the event, indicated the Defense Department's strong support of Zero Defects as a result of the significant savings and improved performance demonstrated by companies which have recently adopted the system.

The importance of Zero Defects, stated Mr. Grohe, can be appreciated when it is realized that even the smallest or most seemingly insignificant defect can cause a missile or vehicle failure

CORPORATE: Marketing, Planning Strengthened

(Continued from Page 1)

managers for the marketing and planning operations under their command. However, the recent corporate actions will permit the preparation of a strengthened framework of over-all corporate planning and guidance leading to more effective deployment of total capabilities and a consequent improvement in new business success rate.

In the corporate Marketing organization under Mr. Lord, Frank S. Perego is director of Domestic Marketing Operations, and General Patrick W. Timberlake, corporate vice - president, Northrop International, continues to direct the company's international marketing effort.

John Alison, corporate vice-president, Customer Relations, continues to be responsible for customer relations wherever they exist. Dr. William C. Ellet is director of Market Research and Analysis.

Also reporting to Mr. Lord are S. W. Towle, Jr., corporate vice-president, Eastern District office; Daniel J. Harnett, director of Contracts and Pricing; and William H. Habblett, director of Special Events.

Increased emphasis has been placed on planning operations. Tactical planning—the search for and analysis of market opportunities — is being performed in Market Research and Analysis. Dr. Ellet and his staff will combine scientific knowledge with marketing know-how in searching out and evaluating market prospects for the entire company.

Their findings re-enforce the marketing work conducted within the divisions and provide leads for new business.

While emphasis on military and space requirements continue, all Northrop Marketing organizations are alert to the possibilities for new programs that can be expected to develop within the government's broadening approach to sociological and geo-political problems.

For instance, the company at present has proposed a promising new project for the Office of Economic Opportunity. This program would provide training in electronics techniques to hundreds of under-skilled persons.

Long Range Planning, in the past performed by Development Planning, has been redesignated Forward Planning. Under the leadership of Mr. Dennis, Forward Planning is focused on studies of long range technical, geo-political, and economic trends that may offer new opportunities for the company.

Forward Planning differs from Market Research and Analysis in that the latter is concerned with specific market opportunities already identifiable. Forward Planning will analyze the total environment in the United States and throughout the world in order to determine fundamental changes that are likely to occur and to identify new opportunities that may result.

Forward Planning will advise corporate and division management as to effects of long range trends on company decisions, particularly those involving the commitment of company resources.

ARMY AWARDS DRONE CONTRACT

Ventura Division has been awarded a $903,000 contract by the U.S. Army for continued production of AQM-38A (RP-76) rocket power target missiles.

The air - launched supersonic target has been used since 1959 by the Army to provide practice for crews operating Nike and Hawk anti-aircraft missile batteries in the U.S. and overseas.

NSL's Kuehnegger Filmed 'Way Out'

Dr. Walter Kuehnegger of Northrop Space Laboratories is "way out" — according to ABC television, at least.

He was featured briefly February 13 on the Wolper Productions documentary "The Way Out Men," seen in the Los Angeles area on Channel 7.

The Northrop scene was of Dr. Kuehnegger clad in a space suit and strapped in the harness of a lunar gravity simulator at NSL.

Nortronics Presents Charter To Anaheim JA Group

Key Nortronics Anaheim management representatives were on hand February 2 for formal presentation ceremonies establishing the Charter of Operation for the Orange County Junior Achievement Company, "DESCAL."

Jim Ricketts, director of Manufacturing, reviewed Nortronics sponsorship of this important youth training program, lauded officers of "DESCAL" for their efforts, and added a special word of praise for Nortronics advisors and alternates for devoting their spare time to the project.

Nortronics advisors include Cy Seeley, chief of Polaris Depot; Leo Gross, foreman, Manufacturing; Dave Harvey, supervisor, Manufacturing Control; and Jim Lyles, manufacturing associate.

Management representatives joining Mr. Ricketts for the affair were: Don McInnis, director of Material; Elmer Noonan, director of Industrial Relations; Ray Schultz, deputy director of Manufacturing; Frank McNabb, director of Quality Assurance; Merrill Skilling, chief of Plant Engineering; and Grant Gunderson, chief of Production. (See photo, Page 3.)

"DESCAL" officers present included Fred Engbarth, president; Jeanne Ryker, treasurer; Jeanne Nault, secretary; and Paul Gallegos, top salesman.

Meeting each Tuesday evening at the Junior Achievement Center, Orange County, "DESCAL" company members are manufacturing and marketing a twin-pen desk set with calendar on a black, hand-rubbed walnut base. It sells for $3.50.

Symphonaires Set Concert in March

The Northrop Symphonaires, under the capable guidance of new director Paul Brizuela, appear March 6 at East Los Angeles Junior College in the Business and Industries Choral Festival sponsored by the Los Angeles City Music Department.

Director Brizuela, associated with Roger Wagner for the past 24 years, brings to the chorus an extensive background in music and special training in choral direction.

For information on the Symphonaires, contact Jeanne Andrecht, ext. 472 at Nortronics-Hawthorne; Ken Getzin, ext. 355 at Palos Verdes; or Bert Bracher, ext. 1022 at Anaheim.

NORTHROP NEWS

Vol. 23 No. 1

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.

Telephone: CR 4-8061, BR 2-8581.

Club News

BOWLING

Scotch Doubles action for couples only will be featured March 14 at Carter Bowl, Fullerton, in a special event staged by the Nortronics Anaheim Bowling League.

Commissioner Chet Guzinski encourages couples to turn out, meet fellow ten-pin enthusiasts, and enjoy a Sunday of family recreation.

BASKETBALL

A cancellation in the Open "A" basketball division in the City of Anaheim has prompted Nortronics Anaheim to enter a second team in this loop, Commissioner Don Ross reports.

The second team has just begun action with the opening of the second round of play. Meanwhile, the original Nortronics entry has chalked up an outstanding league record. Sparking team action has been the steady shooting of John Reitberg, Bill Berger, Jon Klotz, Bob Lawther and Steve Kauffman.

DANCE LESSONS

Whatever your pleasure — the Bossa Nova, Cha Cha or swing — Nortronics' Ballroom Dancing Club has something for you in a new series of beginning lessons just opened.

Students are taking part in a 10-week course with a $5 charge for each dance studied. The Bossa Nova at 7:30 p.m.; Cha Cha at 8:30 p.m.; and eastern swing at 9:30 p.m. are featured. Enter one or all.

Sessions are held at the NRC Clubhouse, Plant 3.

COIN CLUB

Numismatics enthusiasts of the Northrop Coin Club are staging a series of color slide presentations on coins of the world at meetings held the second Monday of each month at NRC Clubhouse in the old Plant 3 cafeteria.

Next session will be held March 8. Meetings held on the fourth Monday of each month at the same location feature auctions and discussions.

Nortronics Anaheim NRC Good Time Table

For enrollment or information on activities listed below, call or contact Personnel Activities, Anaheim, ext. 1092.

ART, Ed Mosher
Meet Wednesdays, 7 to 10 p.m., Clubhouse, 1834 Valencia Dr., Fullerton.

BASKETBALL, Don Ross
Seasonal.

BIBLE STUDY, Marvin Wiebe
Meet Mondays and Wednesdays, 11 to 11:35 a.m., Y-1 room 339.

BOWLING, Chet Guzinski
Mixed Fives meet Tuesday evenings. Men's meet Thursday evenings.

CAMERA, George Baker
Meet 3rd Saturday, 7:30 p.m., Clubhouse.

COIN, Orville Mitchell
Meet 2nd and 4th Tuesday of month, 7:30 p.m.

DESERT RATS, Larry Anderson
Meet only to plan trips.

GEM & MINERAL, Bob Cornelius
Meet 1st Monday of month for business. Meet Thursday, 7:30 p.m. for working night, Clubhouse.

GUN, Pat Elliott
Meet 1st Tuesday, 7:30 p.m., Clubhouse. Second Saturday, 9 a.m., Silverado Sportsmens.

RADIO, Paul Staudenmayer
Meet at noontime and after hours, radio shack.

TABLE TENNIS, Jack Flannagan
Meet for play at noontime.

WOMEN'S, Elaine Steiner
Meet Monday evenings at various places.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 2 | March 10, 1965

T-38 Record Tops News at Other Plants

A new all-time flying safety record, participation in a key technical meeting and initial use of the Project Gemini landing system for a two-man space flight highlighted news of Northrop people and products in other divisions this week.

Norair Division's T-38 Talon trainer set the new safety mark for supersonic Air Force aircraft during 1964, averaging only 2.9 major accidents per 100,000 flying hours, against an over-all average of 4.4 for all types of Air Force planes. It marked the third straight year the T-38 paced all other supersonic aircraft in flying safety.

An unmanned spacecraft meeting of the American Institute of Aeronautics and Astronautics in Los Angeles drew heavily on Northrop talent. Featured prominently were Norair's Richard E. Horner and NSL's Milton Beilock, Roy P. Jackson, John Gustavson and others.

Many papers authored by Northrop Space Laboratories scientists and engineers were presented.

Late this month the first manned flight of a Project Gemini spacecraft is planned. At the conclusion of the flight a Ventura Division landing system will return the spacecraft and its two-man crew to an Atlantic Ocean recovery area.

Aboard will be emergency personnel parachutes, also produced at Ventura, to be used by the astronauts, if needed.

NRC CAN BE FUN

ORIENTAL FLAVOR—Members of Anaheim NRC Art Club use real life models in their painting sessions every other Wednesday at the NRC Clubhouse. Eiko Kinoshita is the model (above), with Harold Leff (left) and Ed Mosher, commissioner, at the easel.

Northrop Credit Union Declares 6% Dividend

Northrop Credit Union members will receive a six percent dividend on 1964 deposits, it was announced this week.

At a board of directors meeting in February, new executive officers and two key committees were elected. Subsequent board and committee action included declaration of the dividend and the election of officers for the present year.

Named president for 1965 was L. L. Cripe. J. J. Richardson is the new vice president and W. T. Gage was re-elected secretary-treasurer.

Board of directors, in addition to the officers, are R. D. Hampton, past president; R. S. Reed, W. D. Schramm, F. R. Smith, J. S. Penrod and D. H. Grothe.

Heading the Supervisory committee as chairman is E. L. Johnson, while G. G. Collins is secretary. Committee members include J. N. Barker, H. J. Grothmann and G. W. Thornton.

L. W. Monger is chairman of the Credit committee which also includes J. L. Dew and F. E. Wolfe.

Mr. Cripe pointed out that 1964 dividends are now being credited to individual accounts and will be reflected in annual statements to be mailed next month.

On behalf of newly-elected officers and board members, Mr. Cripe praised the work of out-

(See CREDIT UNION, Page 6)

Stiff Competition, Busy Future for Northrop Is Told

While warning that future competition will be tough and shifts in direction will be rapid, Northrop President and Chairman Thomas V. Jones told the Nortronics Division Management Club last week that he has no doubts about an expanding future for the Corporation and the aerospace and defense industry.

Addressing a meeting at Long Beach, where the first slate of officers was installed by the new Club, Mr. Jones emphasized new challenges and opportunities for Northrop's diversified divisions as a result of recent shifts in defense and space spending.

"All of you at Nortronics have had a tough row to hoe in the past two years," Mr. Jones said. "I want to compliment all of you for the job that you have done."

Mr. Jones said he felt that recent realignment and consolidation in the Nortronics Division was a big step forward, "one that will go far toward putting Nortronics in a much better competitive posture for the future.

"I am not one of those who is doubtful about the future of our industry, or our company," Mr. Jones emphasized. "I am not trying to paint a rosy picture. Realistically, competition will be tough and the shifts in direction rapid. Some companies will be more successful than others.

"I think there is a great deal of vitality in the technical concept—in the technical philosophy — that we have developed at Northrop. Namely, that the country needs to move in the direction of simpler solutions, less complexity, more economy, and an ability to do the job at less cost," he added.

Mr. Jones spoke of a vast "potential" in the export market and indicated Northrop planned to pursue it vigorously.

"As our F-5 fighter succeeds

(See FUTURE, Page 6)

Installation Marks First Club Affair

Some 250 charter members of the recently re-organized Nortronics Management Club gathered at the Long Beach Elks Club March 2 to hear addresses by top Northrop executives and to install officers.

Highlighting the affair were talks by Corporation President and Chairman Thomas V. Jones and Fred Stevens, Corporate vice president and Nortronics Division general manager.

Installation of officers, ratification of a new constitution and the establishment of regular bi-monthly meetings (on the third Wednesday of the month) was voted during the business session.

Installed were: Frank Caramelli (Palos Verdes), president; Dave Jenkins (Hawthorne), vice president; Roy M. Detmers (Anaheim), secretary; Robert J. Horton (Hawthorne), treasurer; and Ray C. Beamon (Anaheim), sergeant-at-arms.

Under its new concept, the Nortronics Club membership now includes supervisory personnel working at three principal Nortronics functions on the West Coast — Palos Verdes, Anaheim and Hawthorne. It succeeds a former plan in which each location sponsored its own Management Club.

NORCOM Systems Planned For Use in Saturn Projects

Design and production of NORCOM communications equipment is in full swing at Northrop Nortronics' Anaheim facility as a result of recent contract awards totalling over $600,000. The majority of systems are for installation at new NASA facilities.

Largest contracts, from Aerojet-General's Aetron Division in Covina and Lear Siegler, Inc., were awarded to provide multiple channel conference systems within Saturn booster test complexes at NASA's Mississippi Test Facility.

The Nortronics intercom systems will provide operational communications for the pre-test, test and post-test activities during static testing operations of the Saturn booster.

The most recent awards are for NORCOM systems in Saturn SIVB stage vertical checkout facilities at Douglas Aircraft plants in Huntington Beach, California and Sacramento, California.

Stevens Named Chairman

Nortronics Division General Manager Fred Stevens, has been elected chairman of the board of directors of the Southwest Area United Way.

The Northrop vice president has been active in United Way campaigns for many years.

CHARTER MEMBERS DINE—Nortronics Management Club held initial meeting March 2 at Long Beach to launch joint club for West Coast facilities. Affair featured installation of officers, address by Northrop Corporation President Thomas V. Jones, fifth from left, at head table above. Mr. Jones is flanked (left) by Frederick Stevens, corporate vice president and Nortronics general manager, and Frank Caramelli, Club president-elect on his right.

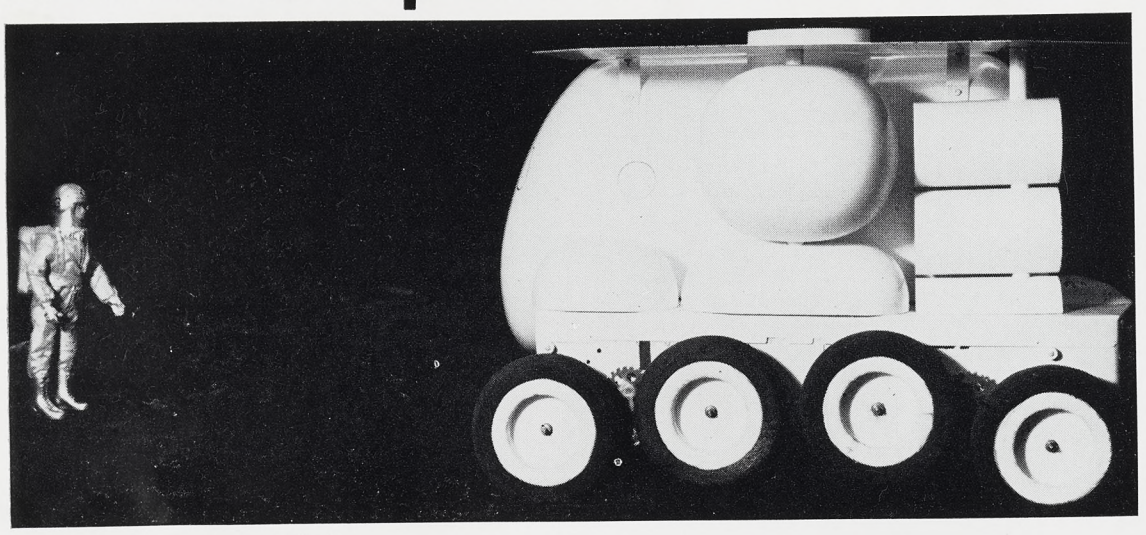
SALES INCREASE; NORTHROP BOARD SETS DIVIDEND

Northrop Corporation board of directors has declared a 25 cent quarterly dividend, payable March 20 to shareholders of record March 4.

Covering the six months ended January 24, financial figures show increases over those for a similar period one year ago.

Consolidated net income was $4,020,000, up from $3,274,000. Earnings are the equivalent of approximately 98 cents per share on 4,219,532 shares, up from 78 cents per share and 4,205,822 shares. Sales were $159,797,000, compared to $144,008,000. Company backlog was $360,476,000, up from $349,487,000.

Northrop Adventures In Outer Space

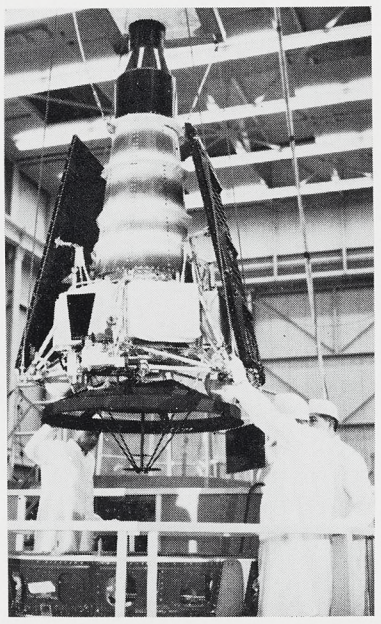


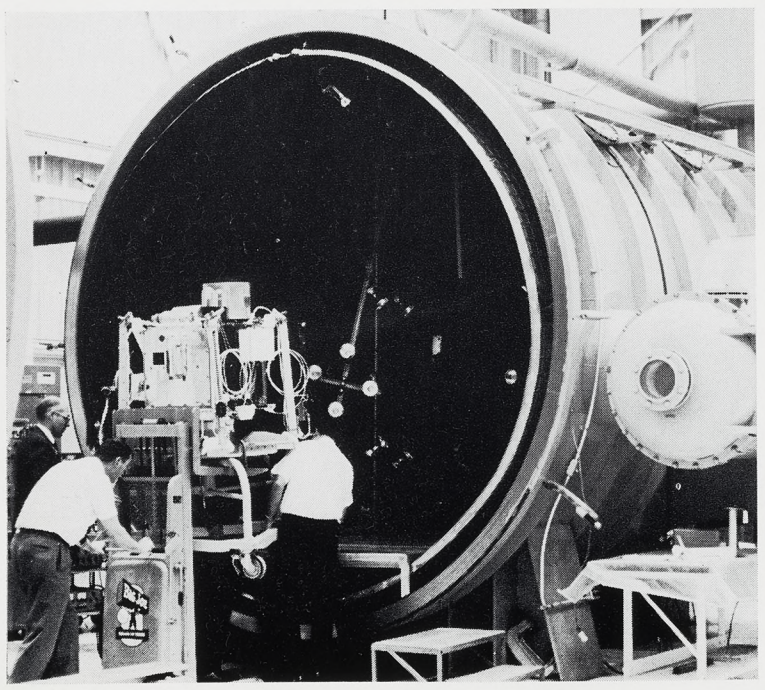
LUNAR SIGHTSEERS

Northrop Space Laboratories, using photos returned to earth by Ranger VII, has constructed one-sixth scale section of lunar surface at Hawthorne to test its choice of a lunar surface vehicle (LSV). Special lighting effects (above) simulate harshness of moon environment. Bill Sponsler (right) is inventor of LSV propulsion system, described as "Walking Beam Suspension." Scale model also got tryouts over earth desert terrain (below). NSL selected the mobility system after four years of research.

TRAVEL BUREAU

Development of space programs depends upon collection of accurate data, such as moon photographs provided from Ranger missions. The success of Ranger VII mission made it possible for NSL to develop LSV, only one of many projects helped by photos. Ranger VIII (right, shown at Jet Propulsion Laboratory) took even better pictures, according to JPL. Nortronics Division and NSL has provided continuing technical support to Ranger program. OV2-1 satellite, which is being tested at NSL (below), will conduct 14 environment experiments when launched into orbit on Titan III-A flight.





NSL Studies Mobility for Moon Team

In a chilly, all-black room at Northrop Space Laboratories, an eerie drama of life on the moon unfolds periodically for the benefit of scientists studying surface mobility systems for use by space travelers after they have landed.

Using a Ranger VII photo as a guide, NSL engineers have built a one-sixth scale replica of a 60-by-90 foot patch of the moon's surface, complete with mountains, craters and rubble.

Top billing in the drama goes to a Northrop-developed lunar surface vehicle (LSV)—the result of four years concentrated evaluation of different mobility systems.

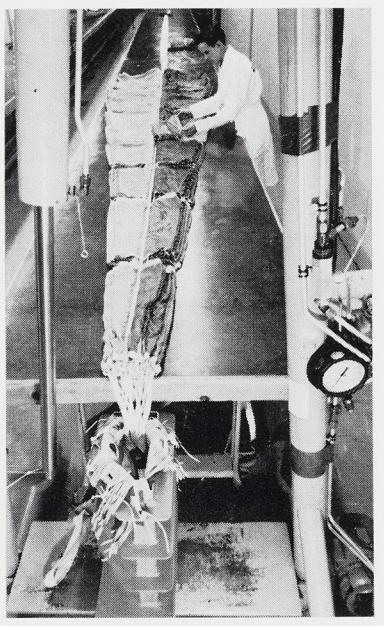
With its eight individually powered wheels attached in pairs to pivoted beams, the scale model LSV makes its way across terrain so rugged and treacherous that it is unimaginable by modern freeway drivers.

Called the "Walking Beam Suspension" by its inventor, Bill Sponsler, the mobility concept is now the focal point of the NSL study.

The complete show on NSL's 10-by-16 foot mockup includes astronauts made to scale and lighting effects which simulate special problems created by harsh solar and reflected earth light.

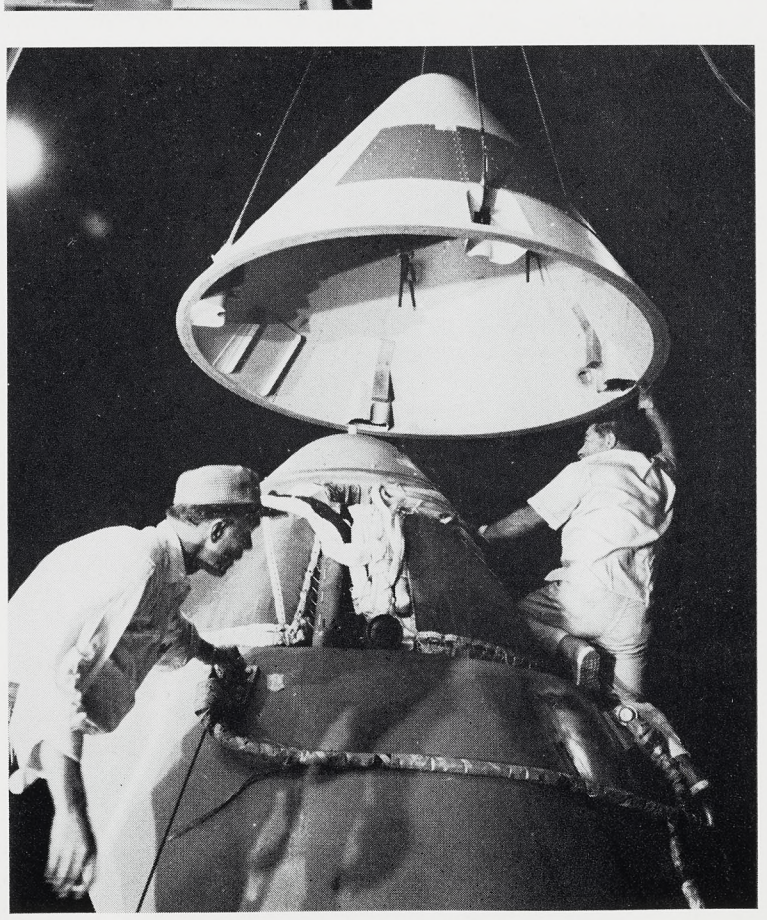
Because of unfiltered light striking the moon's surface, there

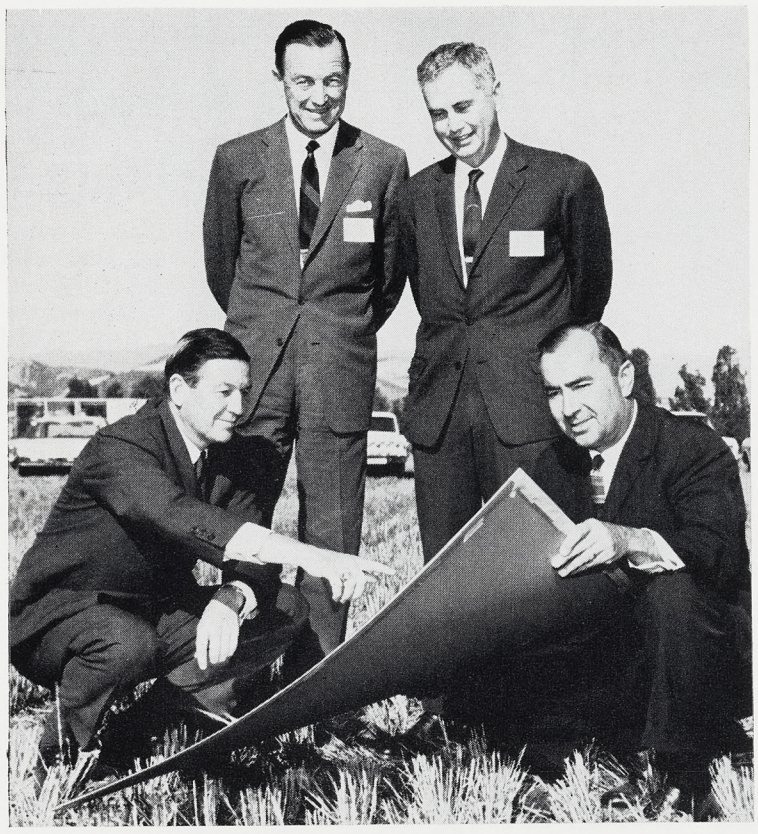
(See LSV, Page 3)



ROUND TRIP

While NSL scientists are studying surface mobility, Ventura Division is preparing for a major development this month in its program to assure astronauts their trips will be two-way. In packing landing system for first manned Gemini flight, Ventura technician (left) arranges and inspects 84-foot diameter parachute before hydraulic pressure equipment packs the material. Landing system (below) is part of the Apollo moon program, another Ventura Division project.





OFFICES GO RIGHT THERE—Northrop's wholly-owned subsidiary, Northrop Architectural Systems, is currently in midst of $1.6 million expansion of offices, production facilities. Looking over plans at site are, from left, Robert Haynie of Hass and Haynie, Thomas V. Jones, Northrop president, Henry E. North, jr., NAS president, and Albert C. Martin, jr., of Albert C. Martin and Associates. New site is in City of Industry.

Architectural Systems Expanding Facilities

A $1.6 million expansion project by Northrop Architectural Systems has gotten under way in the City of Industry, where construction of new production and office facilities is two months along.

Occupancy is scheduled for early July, according to NAS President Henry E. North, jr.

The wholly-owned subsidiary of Northrop Corporation manufactures sliding glass doors, aluminum exterior wall units, windows, storefronts and entrances, and sun control systems. NAS is presently located in the City of Commerce.

Plant capacity will be increased 40 percent when the 300 NAS employees move into the new, 150,000 square foot building.

Facilities are being installed to enable NAS to perform process steps, such as anodizing and surface treatment of metals, which presently must be subcontracted, Mr. North said.

Another prominent feature will be a straight-through manufacturing capability. Pieces of metal entering the plant will not change direction until processing is completed and the product is shipped or placed in inventory.

In further describing the new facility, Mr. North pointed out that as a result of many new efficiencies NAS expects to reduce certain basic production costs.

Located on a 17-acre plot, NAS will have more than twice the acreage of its present location.

LSV

(Continued from Page 2)

are no gray areas. Shadows are completely black and could cause faulty perception, NSL engineers say.

But even with such an adverse environment, the Walking Beam Suspension has been proven exceptionally reliable and maneuverable. Use of "scuff" steering techniques allows the vehicle to turn on its own centerline. Astronauts could make a full 360-degree observation turn before moving in any direction.

In comparative tests with conventional steering mechanisms, the scuff technique proved better in more than a dozen applications, NSL Engineer Sponsler said.

Individually powered wheels and rotating beams allows the LSV to literally pull itself up as much as four feet to clear obstacles. It can also span crevices as wide as seven feet.

A life support cabin, designed to provide a shirtsleeve environment for LSV crews, is another unique feature of the vehicle, NSL reported.

NSL engineers also have worked out special air locks, fuel tank mounts, a vacuum workshop, communications and guidance systems, radiation and micrometeoroid shielding, and space for carrying scientific equipment.

Designed for a two-man crew to conduct two-week exploration missions, the Northrop LSV is considered by NSL to be ideal for Apollo moon landings, but has other possibilities for planetary surface use.

Management Systems Is Topic As Divisions Attend Seminars

An unusual insight into modern approaches to management systems was afforded 78 key management representatives taking part in a series of seminars completed recently at Norair.

Joining Norair participants by special invitation were men from the Corporate office, Northrop Space Laboratories, Ventura and Nortronics Divisions.

Called "Aerospace Management—Change and Challenge," the three seminars were presented by the Management Systems Corporation's Center for Executive Development. Coordinator was Norair's L. H. Walton, administrator of Education and Training.

Seminar participants were selected by top Division management.

Department chiefs and directors took part in two 40-hour seminars during January. A briefer, 15-hour version of the same material, was presented Norair executives during February.

Each session took the form of "case studies" related to the latest Department of Defense and Air Force Systems Command directives and newly issued Army, Navy and NASA requirements. Particular emphasis was placed on new trends in program management and business change.

F. W. "Bob" Lloyd, Norair vice president and assistant general manager—Operations, spoke at one final session, while J. G. Macdonnell, treasurer and manager—Finance, addressed another.

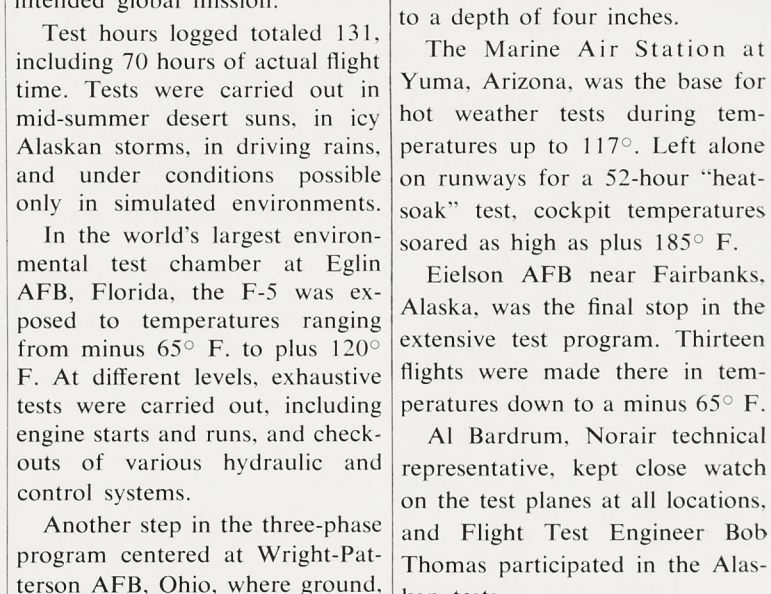
Final Merit Test Set for Saturday

Final reminder to all Northrop Corporation parents with students interested in National Merit Scholarships to be given in 1966 was issued this week.

Last NMSC tests qualifying students for consideration will be given Saturday at high schools participating in the program.

Arrangements to take tests must be made by the student with the school. Primarily, the tests are for students who are now juniors and will be graduating in 1966.

Detailed information on the program is available through high school offices.



LIKE SNOW BUNNIES—Norair's Al Bardrum (left), technical representative, and Ken Baird of General Electric smile before F-5 as pilot, Major N. C. Evans, climbs aboard for one of 13 cold-weather flights made from Eielson AFB, Alaska.

Fighter Withstands Weather Extremes

Every type of adverse weather which nature could provide or man could improvise was used for extreme temperature tests of Northrop's F-5 supersonic tactical jet fighter. Just completed on schedule, the seven-month program proved conclusively that the F-5 is amply suited to carry out its intended global mission.

Test hours logged totaled 131, including 70 hours of actual flight time. Tests were carried out in mid-summer desert suns, in icy Alaskan storms, in driving rains, and under conditions possible only in simulated environments.

In the world's largest environmental test chamber at Eglin AFB, Florida, the F-5 was exposed to temperatures ranging from minus 65° F. to plus 120° F. At different levels, exhaustive tests were carried out, including engine starts and runs, and check-outs of various hydraulic and control systems.

Another step in the three-phase program centered at Wright-Patterson AFB, Ohio, where ground, taxi and flight tests were conducted during rainstorms and icy weather conditions.

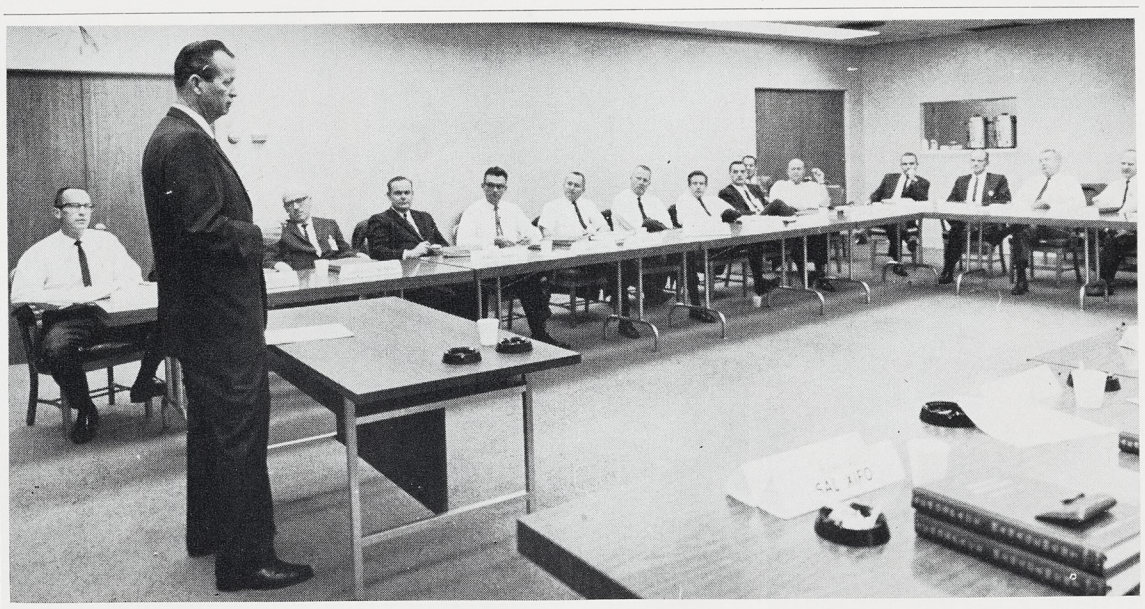
A unique test sent the F-5 to altitudes between 16,000 and 20,000 feet to fly behind an aerial tanker releasing water spray. Ice buildup on jet intakes measured ¼-inch, with wing surfaces coated to a depth of four inches.

The Marine Air Station at Yuma, Arizona, was the base for hot weather tests during temperatures up to 117°. Left alone on runways for a 52-hour "heat-soak" test, cockpit temperatures soared as high as plus 185° F.

Eielson AFB near Fairbanks, Alaska, was the final stop in the extensive test program. Thirteen flights were made there in temperatures down to a minus 65° F.

Al Bardrum, Norair technical representative, kept close watch on the test planes at all locations, and Flight Test Engineer Bob Thomas participated in the Alaskan tests.

Major N. C. Evans of Wright-Patterson AFB ferried the F-5 to and from Alaska and flew test missions.



MANAGEMENT SYSTEMS MESSAGE—F. W. "Bob" Lloyd, Norair vice president and assistant general manager-Operations, addresses participants in one of three management systems seminars just completed. Seventy-eight key management men, including representatives of all divisions and the Corporate Office, took part. Seminars offered rare insight into modern approaches to management systems and concentrated on latest DOD, military and NASA directives.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Florence & Figueroa or Florence & Hoover, Los Angeles. Lyman Doster, ext. 2075, 1324, PL 8-5621. 2

8 a.m. — 4:45 p.m.

Inglewood Ave & 134th Pl. Hawthorne. Dorothy L. Muzik, ext. 2123, 2470, OS 6-0790. 5

Crenshaw Blvd. & 180th, Torrance. Bonnie Condon, ext. 618, 323-4342. 5

Rides Offered

8 a.m. — 4:45 p.m.

Crenshaw Blvd. & 180th, Torrance. Bonnie Condon, ext. 618, 323-4342. 15

The Impact of Science: Lifelong Education

By C. M. WONG, Ph.D.
Chief, Norair Structures and Auxiliary Systems

It has been said that 95 percent of all the scientists who have lived during the period of recorded history are alive today. As a result of their efforts during the past two decades, the level of understanding of the physical world in which we live and the ability to put this understanding to work have progressed at a phenomenal rate.

In turn, the degree of complexity of our way of life seems to have increased exponentially. The impact of new knowledge made available by the rapid progress in science and technology has been felt by all of us. There seems to be an unending need for new tools, methods, skills, and philosophies to cope with the tremendously complicated problems of this generation.

In the face of these demands, the need for education is greater than at any previous time in history. In order that we may equip ourselves and our children for the challenging tasks of the future, we must take full advantage of all of our educational opportunities, both formal and informal.

Dr. Wong

It is clear that we could never learn all there is to know about the world we live in. In order that an accumulation of knowledge will not be random, we must, in my opinion, strive for an ultimate goal. This goal may be immediate or it may be in the future. For most of us, it is perhaps better that our goals be definable in terms of a job to be done or an attainable objective to be reached. Most people prefer to see the results of their labors and to find in the attainment of specific objectives the reward and encouragement necessary to continue striving for greater accomplishments.

Very few of us can continue to be motivated by curiosity alone, as perhaps a theoretical mathematician might be while developing sophisticated theories which may not be proven or become useful in his lifetime.

Education can be achieved in many ways, and we must make maximum use of all of them if we are to equip ourselves for the challenging tasks of our lifetime. I would like to discuss some of these forms or modes of education as I see them.

1. **FAMILY EDUCATION:** Notwithstanding an extremely busy professional career in the Government of the Republic of China, my father managed to slice a considerable amount of time from his heavy schedule to personally inspire his children. He encouraged each of us to be curious, outstanding in achievement, and to contribute to God and mankind. I feel that as parents we all owe our children not only the benefit of our educational background but the encouragement to exceed our accomplishments, educationally speaking.

2. **FORMAL EDUCATION:** In the ordinary sense, this mode of education concerns training for pre-planned curricula and schedules received from an establishment we call school. Although there are diverse qualities or grades of the same degree awarded from many academic institutes, usually the higher degree indicates a greater effort or deeper concentration. A higher degree is always preferable, but it is not the only criterion demanded of us in order that we be capable of fulfilling our job requirements. Strong common sense, sound judgment, and fairness to everyone, to complement the knowledge acquired in the pursuit of our degrees, are the keys to success.

3. **INFORMAL EDUCATION.** The completion of our formal education should by no means be the end of our educational program. The commencement exercise in the formal institute is only a pause in the long educational journey. This informal mode of education may not take a standard or rigid form. We are constantly being influenced by people, environment, and other things around us. Never underestimate the power of your fellow workers. In my experience, they are among the best teachers in life.

4. **UNIVERSAL EDUCATION:** This mode of education may be the most significant of all for the individual, for it includes the experience gained from the job and the techniques developed through all forms of education. Since we are living in a constantly changing world, we must continue learning to meet the world's challenges. Not only is continued learning a rewarding activity, but the more we learn the more we discover there is to learn.

5. **BROAD EDUCATION:** We should never overlook general and broad basic training as we master our professions. In order to be a well-developed human being, one should not concentrate his attention and efforts in one particular field alone; instead, he should become interested in other areas of education—for example, in art, international affairs, and politics. Nor can one have a complete education without personal discipline. My family's determination to live according to principle, to choose the less easy way, has contributed enormously to our disciplined capacity for getting things done.

"Harvest comes from effort, patience, and sacrifice," as one of my countrymen said many years ago. Strong commitment and determination are needed in the attainment of one's educational goals because the process of learning is like rowing a boat upstream. If we do not continue at a reasonable rate of speed, we do not advance, and we are in peril of being pushed back. We can never remain stagnant or stationary in our world of rapidly advancing technology. If we stop learning, we stop living — and the world and nature will not sympathize with those who have no desire to improve themselves.

REAL SPLASHING OCCASION—Captain William G. Bookout, USAF instructor pilot at Reese AFB, Texas, recently became that base's first man to log 1000 hours piloting Northrop T-38 Talon trainer. Fellow pilots and others greeted him on arrival and had him run a water bucket gauntlet. He became sole member of the new 1000-hour T-38 Club there.

Parents Key to Learning Through Life, Wong Says

One of Northrop's most educated men likens education to rowing a boat upstream. If a person doesn't continue to row at a reasonable rate of speed he not only will not advance, but is in peril of being pushed back.

And Dr. C. Ming Wong, chief of Structures and Auxiliary Systems at Norair Division, believes that parental influence is the first and foremost element in the success of an individual's lifelong education.

The parents' responsibility is more than just providing opportunity for children to go to school, Dr. Wong feels: the parent must impart the basic tools of learning — values, logic and discernment.

"My father, with love and firmness, trained us in the classics and the classical tradition," Dr. Wong said, "and he taught us to organize our thoughts.

"He spent many hours on the subjects of values, logic and discernment, and his influence is still most important. Without this parental atmosphere, educational processes — especially in the advanced degrees—become difficult, often impossible."

Now a parent and a Ph.D., Dr. Wong has written a summary of his views (which appears on this page) on education, at the request of the NORTHROP NEWS.

Born and raised in pre-Communist China, Dr. Wong need only to point out his family's educational record to emphasize the effect of his father's influence. Of the 12 Wong children (11 boys and 1 girl), all have college degrees, and all graduated with honors.

After earning a degree in mechanical engineering from Southwest University (1942) in his homeland, Dr. Wong emigrated to the United States to fulfill his ambition for an advanced degree.

Education is not a luxury, Dr. Wong says, but an obligation—an obligation to self, to country, and "as the Chinese see it, to one's honorable parents."

Technical Veterans Get New Posts

New assignments for two Norair veterans have been announced by W. E. Gasich, vice president and assistant general manager—Technical.

R. E. Kosin, formerly of the X-21 Program, has been named technical assistant to Mr. Gasich.

B. F. Collins, special assistant to Mr. Gasich who has worked with Marketing on Navy sales programs, has been re-assigned as assistant to J. C. Cassell, director of the F-5 Program.

T-38 Veteran Gets Honor—Water Deluge

An unusual initiation—a water dousing — greeted the initial Air Force pilot at Reese AFB, Texas, to log 1000 hours at the controls of the Northrop T-38 Talon trainer.

Captain William C. Bookout found fellow pilots, students, ground crew members, maintenance personnel, and even a few passers-by, amply armed with "loaded" buckets as he taxied in after passing the 1000-hour flight mark.

Then he got it!

An instructor pilot assigned to the 3501st Pilot Training Squadron since 1960, Captain Bookout becomes the sole member and presiding officer in the exclusive 1000-hour T-38 Club at Reese AFB.

At Reese his T-38 flying experiences are legendary. Last October he brought a T-38 home safely after a mid-air collision near Lovington, New Mexico.

Anaheim Finishes First Aid Class

Initial group of Nortronics-Anaheim employees to complete a special Red Cross First Aid training course received certificates recently from Production Chief Grant Gunderson.

All volunteers, the trainees attended special one-hour sessions one day a week for a nine-week period. Sessions were held immediately after the conclusion of regular work shifts.

Instructor was Officer Lee Bratten of Security and Plant Protection group.

Graduates included Pete Falk, Paul Engstrom, Howard Campbell, Sol Del Grasso, Tom Boswell, Jim Donovan, Eddie Robertson, Jack Kinzer, Walter Hoppe, Tom Runnels and Ralph Jenkins.

Additional courses in the same subject as well as medical self-help offered through the Anaheim Civil Defense office are being studied. Interested personnel may contact Safety Engineer Bill Cornett, ext. 615, to enroll. Classes will be scheduled as interest warrants, Mr. Cornett said.

RARE SIGHT, INDEED—While Norair folk know the F-5 from the "ground up," few have an opportunity to see it painted, marked and armed because this production step is handled in Palmdale. Recently, the F-5B (shown above), and F-5A were on display at Hawthorne where they were viewed by some 5000 employees. Director of Flight Operations Bob Elder (left) chats with John Fritz, test pilot, and Les Gebro, inspector, after arrival of planes.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

TV, 24" Packard Bell, remote control, maple cabinet, $130. Pacoima, 882-0761. A

Shotgun, Winchester auto., model 50, 20 ga., deluxe polychoke & recoil pad, $85. L.A. 47, PL 6-0015. A

Valiant Station Wagon, 1962 V-200, air, cond., new tires, r/h, auto. trans., $1295. Lomita, DA 6-6214. A

Garbage Disposal, deluxe model, $30. Gardena, 679-3927. A

Station Wagon, 1950 Ford V-8, p/s, new tires, $850. Gardena, 324-5961.

Encyclopedia Britannica, deluxe White Ed., $30 dn., take over $14 mo. pmts., $315 bal, P. V. Estates, FR 5-5097. A

Lawnmower, 3 hp, rotary, gasoline, $25. P. V. Pen., 377-5319. A

Auto Tow Bar w/auto. brake control, $25. Hawthorne, 675-1031. A

Sewing Machine, $35. Hawthorne, OS 5-1057. A

China, Easterling, Damask pattern, 4 5-pc. place settings w/creamer & sugar, platter & lge. bowl, $100. El Segundo, EA 2-0678. A

Golf Clubs, starter set, $25. Beverly Hills, CR 6-4879. A

TV, 23", remote control, $95. Torrance, FR 1-2526. A

Radio, exec. model 100 CB, $150. Torrance, DA 5-3724. A

Outboard Motor, Scott, 10 hp, incl. 6-gal. remote gas tank, Bail-A-Matic, trolling plate, $100. Inglewood, 671-4986. A

AQUARIUM, 10-gal. w/stand & equipment, $35. Hawthorne, OR 1-1660. A

Student Desk, natural finish, $15. Long Beach, GA 3-1363. A

House, 3-bdrm., 2-bath, GE kitchen, patio, fireplace, landscaped, fruit trees, near schools, 1600 sq. ft., $42,750. Rolling Hills, 833-9747. A

Falcon, 1960 4-dr. sedan, r/h, new w/w tires, $450. Hawthorne, OS 6-3912. A

Pontiac Catalina Station Wagon, 1959, 9-pass., r/h, w/w, under 50,000 miles, $995. Gardena, 323-6894. A

House, 3-bdrm., 2-bath, all elec., in Fallbrook area, incl. 6½-acre avocado grove, $15,000 dn., $61,000. San Pedro, 831-0063. A

Photo Mural, 40"x60", framed, black & white, San Francisco night scene, $10. Torrance, DA 5-5245. A

Acreage, 5, level, in Lassen Co., Calif., $1150. Box 201. A

Falcon Station Wagon, 1962 deluxe, fully equipped, auto., 30,000 miles, Torrance, $1335. DA 6-5558. A

Coin Books, set of 12 green books by Meghrig, $7. Hawthorne, 679-1992. A

Chord Organ, small, $40. Torrance, 325-1204. A

Monza, 1963 coupe, r/h, auto. trans., 15,000 miles, $1450. Inglewood, PL 4-7861. A

Sofa Set, $7. Lawndale, FR 1-8590. A

Motorcycle, 500 sgle., 1954 Velocete, recently o/hauled, new paint, $200. Hawthorne, OS 6-4923. A

Chrysler, Windsor, 1956, 2-dr. h/top, r/h, auto. trans., $295. Torrance, 371-8701. A

Organ, Lowrey, Heritage model, full keyboards w/upper & lower manuals, vibrato-sustain tabs, $1000. Inglewood, PL 5-0137. A

House, 3-bdrm., redecorated, covered patio, 2-car gar., lge. yd., near El Camino Col., $23,000. Torrance, OS 5-2522. A

TV, color, 21", Danish modern console, Packard Bell w/UHF, 1-yr-old, walnut, $350. Beverly Hills, CR 5-7341. A

Record Player & Radio, Zenith, 4-spd., auto., portable, mahogany, $35. L.A. 5, 384-4017. A

Ice Box, 18"x24"x48", $10. Torrance, FA 8-3306. A

Pontiac Catalina Station Wagon, 1960, $50 & take over pymts., $1150. Hawthorne, 322-6430. A

House, 3-bdrm., family rm., 2-bath, GI loan, $110 mo., near school & shopping, $29,500. Redondo Beach, FR 6-6415. A

Washer, GE auto., $75. Hawthorne, 676-8279. A

Boat, 25' Owens, 1959 model, s/s radio, depth finder, sleeps 4, $3500. Huntington Beach, 897-3436. A

Stove, apt-size, 3½-yrs-old, $30. Inglewood, 676-2958. A

Electronic Flash, ultrablitz Monojet II, 40 watt secs., rechargeable Nicad battery w/charger & ac cord, $35. Los Alamitos, GE 1-4233. A

Trumpet, Olds studio w/case, $135. Redondo Beach, FR 5-2789. A

For Sale

Falcon Station Wagon, 1961, 4-dr., deluxe, auto., r/h, new tires & shocks, $975. Torrance, DA 5-7705. A

End Table Set, mahogany, $19. L.A. 43, AX 1-3778. A

Outboard Motor, 1960, 40-hp, Elgin, long shaft, $200. Lynwood, NE 1-6933. A

Stove, Western Holly, built-in cook top & oven w/broiler, stainless steel, $100. Torrance, 325-5559. A

Chevrolet, Bel Air sport coupe, 1957, new paint & tires, $600. L.A., GR 4-9790. A

Chevrolet, 1955, new brakes & tires, r/h, $350. Manhattan Beach, FR 2-0307. A

Stenograph, mfd. by Hedman Co., $65. Torrance, 327-8582. A

Love Seat, custom-made, print slipcover, $50. Manhattan Beach, FR 9-2068. A

Freezer, Frigidaire, chest-type, $75. Manhattan Beach, FR 2-0720. A

Couch, French provincial, $85. La Habra, 714-879-8724. A

Metro Sedan, 1957, over 30 mpg., $350. Hacienda Heights, 336-3453. A

Apt Bldg., deluxe, 4-unit, 6-mos-old, 1 blk. from Northrop, $71,000. Hawthorne, 676-6134. A

Surfboard, Sweet, 9', $50. Hawthorne, OS 6-8887. A

Lot, Inglewood Park Cemetery, double interment, $910. Hawthorne, 672-1036. A

Couch & Chair, brown leather recliner, $150. San Pedro, TE 1-4960. A

End Table Set, mahogany, round, leather top, $25. P. V. Pen., 377-5075. A

Bedroom Set, walnut, nite stands, chest of drawers & dresser, $295. Lawndale, 676-3050. A

House, 4-bdrm., family rm., 2-bath, 1/3 acre, pool, landscaped, 3-yrs-old, low dn., $38,900. Northridge, EM 3-1679. A

Buick, 1957, fully powered, $275. L.A., 753-5129. A

Pup, Chihauhua, 3-mos-old, AKC & shots, $35. Torrance, FR 1-2705. A

Chevrolet Impala, 1961, 2-dr. h/top, air cond., Powerglide, $1595. Pomona, 593-5720. A

Bicycle, Girl's 26", $20. Gardena, DA 4-8853. A

Television, Zenith table model w/stand, $25. Inglewood, PL 5-4497. A

MGA, 1960, 2 tops, recently o/hauled, r/h, good tires, $1100. Box 202. A

Mags, American, for 14"Chevrolet wheels, $105. Lawndale, OS 5-4305. A

Cervair, 1961 700 Deluxe, 4-dr., auto trans., r/h, $750. P.V. Pen., FR 7-3649. A

BMW, 1964, 2-cyl., 2 carb, 2 coils, 42 mpg, w/w, Porsche trans., sport cpe., $845. Tarzana, 345-1649. A

Air Conditioner, Fedders, ¾-ton, 110 volt, $35. Hawthorne, 676-1018. A

Olds 88, 1961 4-dr. h/top, r/h, Hydra., p/b, p/s, p/w, 4-way seat, fac. air, orig. owner, $1525. Downey, TO 9-6163. A

Crib, w/pedic mattress, blonde,$28. Gardena, 327-2279. A

Austin Healey 100-6 Standard, 1959, new paint, $950. P.V. Estates, 377-6658. A

TV, 23", Zenith w/remote control, 2-yr-old, console walnut, $119. Hawthorne, OS 5-7938. A

Duplex, 2 bdrms. ea. side, dble. gar., $21,500. Yucaipa, WH 1-0856. A

VW, 1955, sun roof, 1961 eng., $500. L.A. 8, 291-7715. A

TV, Zenith, 16" UHF-VHF portable, used less than 4 hrs., $100. Playa del Rey, 398-3018. A

Rambler American 220, 1964, 2-dr., 6-cyl., stick, 7400 miles, $1350. Granada Hills, EM 3-8838. A

Colt, 357 mag., also shoot 38 special, w/holster, $60. Gardena, DA 9-5359. A

Bicycle, Schwinn Varsity, 10-spd., $40. Fullerton, 529-3158. A

Chevrolet 6 Biscayne, 1962, r/h, 4-dr., stick, $995. Huntington Beach, 714-962-3834. A

Home, 3-bdrm., patio, thermo heat, near schools & shopping, $26,500. Culver City, EX 1-4106, UP 1-0959. A

House, 3-bdrm., 2-bath w/utility rm., 35' living rm., P.V. stone fireplace, lge. fenced yd., $21,500. Walteria, 378-7742. A

Runabout, 14', w/steel trailer & spare wheel, $40. Granada Hills, EM 0-2483. A

Sprite, 1959, $600. Torrance, 371-0768. A

Sunbeam Alpine, 1962, $1295. Arcadia, 445-3009. A

Dodge, 1958 station wagon Sierra 9-pass., new tires, o/hauled, p/s, p/b, $500. Torrance, 320-2827. A

Lawnmower, Garden Queen, hand-type, 4-yrs.-old, $5. Calabasas, 889-8091. A

Chevrolet, 1951, 2-dr. sedan, r/h, Powerglide, smog device, $200. L.A. 49, 472-2031. A

House, 3-bdrm., family rm., 3-bath, 2000 sq. ft., corner lot, incl. living rm. furniture, $43,750. San Pedro, TE 1-2973. A

House, 3-bdrm., block fence, corner lot, 1 blk. from school, 3-yrs.-old, 1½-bath, covered patio, $22,750. Long Beach, TE 4-7823.

Surfboard, 8' 6" Lyman, $35. Torrance, DA 5-0309. A

Luggage Carrier, leatherette, encl. bottom zippered front, lge. size, $15. Torrance, 370-4101. A

Dodge Dart 270, 1964, fully equipped, $200 dn. & take over pymts., $2000. Van Nuys, DI 3-8055. A

For Sale

House Trailer, 1957 Transahome, 8'x40', 2-bdrm., incl. 2 porches, fences & 4'x8' storage bldg., 12 minutes from Northrop, $1850. Gardena, 323-6102. A

Wanted to Buy

Baby Furniture in good condition. Torrance, FA 0-3782. B

Patio Table, wrought iron, glass preferred, expanded metal acceptable. 328-8181. B

For Trade

House, small, on 50' x 150' R-2 lot, trade for duplex or 2 houses on one lot. 376-8545. C

Gold Dredge, 20 cu. yds. per hr., 5 hp, Briggs, air & reserve for 2 divers, many extras, trade for late model 10-hp or more Johnson outboard eng. Redondo Beach, FR 8-2609. C

Rentals Offered

Apt., 1-2 bdrm., air cond., stove & refrigerator, $110-125. Studio City, PO 3-1024. E

Apt., 1-bdrm., closed gar., laundry fac., $89. Torrance, 714-892-7440. E

Apt., unfurn., 2-bdrm., 2 children o.k., 20 min. from Northrop, carport, laundry rm., $90. Lynwood, 635-3784. E

Apt., 2-bdrm., furn., upstairs, gar., 5 min. from beach, $120 mo. Hermosa Beach, FR 2-5985. E

Apt., 2-bdrm., 2-bath, pvt. patio, laundry rm., gar., fences, 1165 sq. ft., $165 mo. Torrance, 375-1766. E

Apt., 3-bdrm., furn. or unfurn., $115-$130 mo. Eastview, TE 1-3737. E

Apt., 1-bdrm., unfurn., walking distance to Northrop, water & trash pd., $92.50. Hawthorne, 676-1678. E

Apt., unfurn., 2-bdrm., near South Bay Center, $95 mo. Redondo Beach, 376-4978, 374-4317. E

House, 2-bdrm., 1½-baths, 2-story, decorated, unfurn., $125. Manhattan Beach, FR 4-8608. E

Studio Apt., unfurn., 3-bdrm., 2¼ baths, soundproofed, pvt. patio, closed gar., $170 mo. P.V. Estates, FR 5-0867. E

Apt., 1-bdrm, unfurn., garage, close to Northrop, $90 mo. Torrance, DA 9-0314. E

House, 2-bdrm., water & trash pd., children o.k., no nets, $105. Lawndale, 371-6775. E

Sleeping Rooms, pvt. entrance & bath, utilities furn., close to Northrop, $45 mo. Lawndale, 676-7328. E

House, 2-bdrm., stucco, redecorated, near Northrop, $105. Lawndale, OS 5-9695. E

Exec. Apt., 2-bdrm., 2-bath, 1500 sq. ft., by appt., $160. Inglewood, 373-1143. E

Apt, 3-bdrm., 2-bath, pvt. patio, serv. room, fireplace, forced air heat, avail. April 1, near Norair, $180 mo. Hawthorne, 679-1358. E

Personals

To All our wonderful friends of Northrop Norair, Nortronics, & the AFPRP group, we thank you most humbly for your kind expression of sympathy in the loss of our beloved mother. MAXWELL G. & OLIVER W. PELLERIN. L

I Wish to thank all my friends at Northrop for their kind expressions of sympathy at a time when it was deeply appreciated. MRS. HUBERT DUNSTON. L

I wish to express my appreciation to my friends at Northrop for their sympathy & kindness. ELMER E. JUNGCLAS. L

Obtain pvt. pilot's license as part owner of late model aircraft. Rolling Hills Estates, FR 7-3810. L

For Sale or Trade

Chevrolet Impala, 1964 s. s., 4-spd., pos. traction, $2150 or trade other car for my equity. Hawthorne, OS 6-7417. M

Gene Browne Met Jack Northrop As 12-Year-Old, Asked for Job

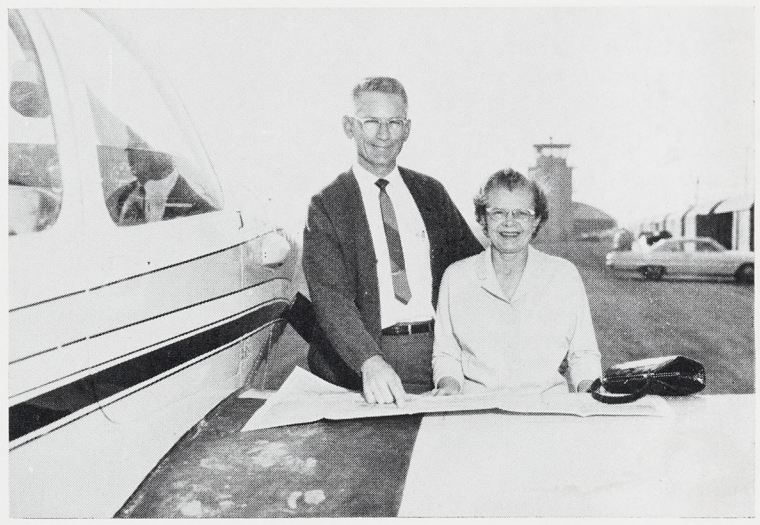
Gene Browne was 12 years old when he first met Jack Northrop and asked:

"Sir, when I learn a whole lot more about airplanes—and I will—do you think you might give me a job?"

The time was the late 1920's, and Mr. Northrop had just finished addressing a youthful assemblage of model airplane clubs in Glendale. As program chairman for his club, Gene had arranged for Mr. Northrop to speak that day.

Now a senior technical specialist in Design Integration and 24-year veteran at Norair Division, Gene recalls that it was more than 10 years before he became personally involved with the Northrop name again.

But during that period, he never lost his interest in airplanes. Immediately upon graduation from high school in Glendale and Glendale Junior College, he attended the fledgling aircraft training center—Curtiss Wright Tech.



Aircraft provides large portion of the Gene Brownes' leisure.

Gene possessed meticulous hands, the tools of an expert draftsman. He is also a perfectionist, and no task has ever been too small to warrant the utmost concentration and exacting detail.

He joined Hughes Aircraft Company as a member of a 14-man engineering group which was designing a twin-engine fighter for the Army Air Corps.

Here he learned for the first time the bitterness of defeat.

"We lost that contract," Gene said, "but we were still proud of our showing in rough competition." The design that beat Gene's group became the P-38.

Next came a fling at consulting. When no one seemed to require the services of a consultant aeronautical engineer, he moved to North American Aviation at El Segundo where he worked on the DB-7 and the A-20, of which 7000 were built in World War II.

In 1940 he became a Northrop employee.

Since that date, Gene has had a hand in designing every flying product to bear the Northrop name—the N-3PB, the Flying Wings, B-35, B-49, the XP and P-61, XP-56, XS-4, the T-38 and the F-5. Along the way there has been work on the Hawk missile, plus proposals, studies, mockups, and many other assignments.

Special highlights of Gene's long career include work on the first full power control system in the industry (for the B-35).

"There was only the power boost system prior to that time," Gene said. "Northrop opened the door on the use of servos and hydraulics to do the complete job, and the big switch was on."

Six patents have been issued for Gene's innovations by the U. S. Patent Office and one by the British Government, all in the field of improved control systems.

One fact about control system developments that amazed Gene is the remarkable "staying power" of cables, which are still in use just as they were on the first aircraft. But he reasons that electronic systems for controls are just around the corner. They would possess self-tuning characteristics keyed to flight environment.

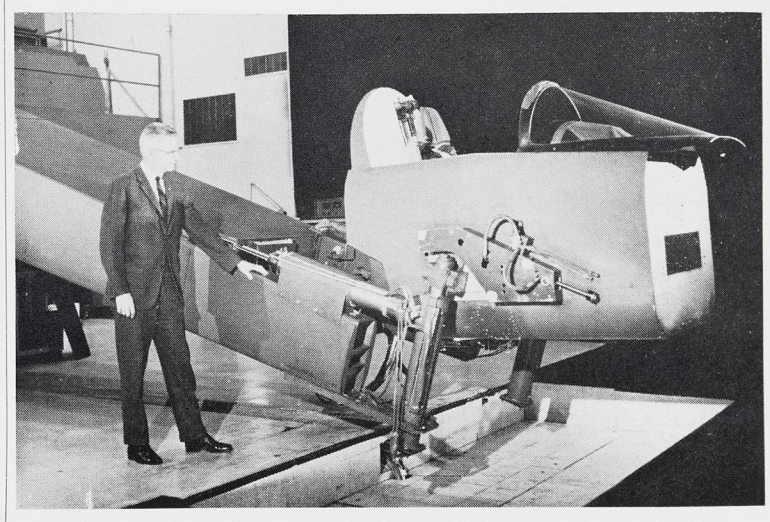
"When electronic systems for controls are finally perfected, they will be automatic in the fullest extent," he reasoned. "Then the pilot will be along to manage the flight more than anything else."

Computers are making engineering tasks much easier in design fields and are helping save millions of dollars, Gene added. He pointed out that the Northrop dynamic flight simulator with its six degrees of freedom makes it possible for computers to tailor aerodynamic controls to the mission and environment before the system ever becomes airborne.

As a seasoned pilot himself, Gene has been in a good position to contribute to the Northrop reputation of manufacturing a "pilot's airplane"—honest craft distinguished for flight handling responsiveness and the utmost compatibility between man and machine.

He has logged more than 450 hours in the air and was a charter member of the old Northrop Flying Club. He now belongs to the A&E Flying Club, composed of Northrop and STL employees.

In looking back over his career (which is still very active), Gene is never at a loss for stories to tell his seven grandchildren. But one of his favorites will always be that day in Glendale when a patient and knowledgeable man took the time to answer a youth's eager questions.



And aircraft is Gene's profession, which spans three decades.

Donors Boost Blood Supply At Anaheim

Nortronics-Anaheim volunteer donors turned out in force February 19 to give 119 pints of blood during a visit to Anaheim of the American Red Cross Bloodmobile.

Blood donated was turned over to the Northrop blood program and is now available to all Northrop employees and members of their immediate families without charge.

In addition to assisting the Northrop program, each donor also established an individual credit with the Red Cross enabling them to receive blood through a majority of Red Cross Chapters across the nation in emergencies.

Bloodmobile visits are traditionally scheduled once each year at the Nortronics-Anaheim facility.

Air Force Pilots Fly F-5s to Sweep In Gunnery Meet

A United States Air Force gunnery team flying the Northrop F-5 won all four events at the recent Luke AFB, Arizona, "Bull's Eye II" gunnery meet.

Four F-5s competed against five F-100 teams with 20 aircraft and two F-104G teams with eight aircraft. Events were skip bombing, dive bombing, rocket firing and ground gunnery.

An Air Force source evaluating the meet noted that the winning F-5 pilots averaged less than 80 hours experience each in the aircraft versus hundreds of hours for pilots of the competing aircraft.

NORTHROP NEWS

Vol. 23 No. 2

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.

Telephone: CR 4-8061, BR 2-8581.

COLUMNIST GOES AIRBORNE—Art Buchwald, national syndicated columnist, gives out big grin as he climbs aboard Northrop T-38 for orientation ride at Edwards AFB, California. His "chauffeur" was Major Bob Rushworth, USAF, one of the X-15 research plane pilots. Mr. Buchwald reported experience as "one of my most thrilling moments."

Two Million Perfect Stitches Mark Ventura Fabrication

Quality Control inspectors — whose job it is to discover any flaws in fabrication of products — are still shaking their heads with awe this week over a recent job by the Experimental Fabric Fabrication group at Ventura Division.

In putting together a parachute for the Apollo landing system, a team of 24 men and women made close to two million perfect stitches in the nylon fabric.

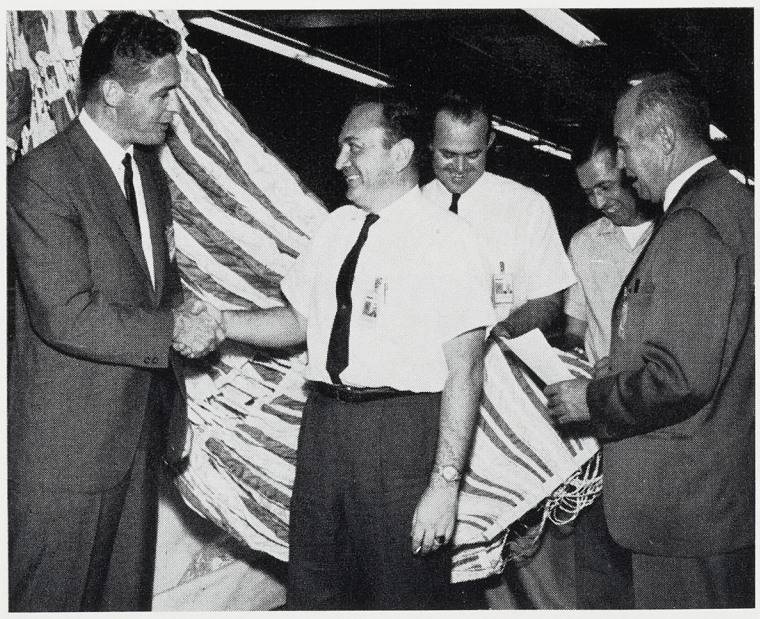
Although the chutes are always perfect when they leave the Newbury Park facility, this is the first time a perfect product has been turned out on the initial assembly, according to Stiles Burke, chief of the Fabrication group.

In addition to the three and one-half miles of stitching, the perfect 84-foot wide chute required two miles of tape and webbing, one and one-half miles of suspension lines and 700 yards of 42-inch nylon sails.

Just to prove the first job wasn't a fluke, the same team turned out a 127-foot wide parachute without a single defect a week later.

General Foreman Ted Szestek and Foreman Bob Barcena headed the fabrication team which included:

Lena Conti, Darlene Shoemaker, Carmen Penninson, Carol Regalado, Bobbie Taylor, Florence Lojewski, Mary Helen Garcia, Shirley Woodall, Esther Huggins, Nellie Cook, M. E. Garcia, Dolores Caldera, E. C. Parker, Linda Wagner, Peggy Jones, Wileen Willson, Mary Jankins, Lorraine Newton, Thursa Summit, Sue Amison, Rosie Basva, and Nelda Freymond.



IT'S TRUE—NASA's Hank Blazer (far right) goes over parachute once again with Ventura Division Quality Control men John Simpson and Stan Nutter to confirm initial fabrication without defect—involving three and one-half miles of stitching—of Gemini Project landing equipment. NASA's Tom Hughes (far left) congratulates Fabric shop General Foreman Ted Szostek on the job, which involved 400 man-hours of errorless work.

F-5 SALES TOP $250 MILLION; 350 ON ORDER

Total sales of the F-5 supersonic fighter have passed the $250 million mark, with more than 350 of the Norair planes ordered to date.

Announcement by the Spanish Ministry of Air that it will place a $47 million initial order for 70 F-5 tactical fighters is the Company's latest order. Spain is making a direct purchase with its own funds to re-equip the Spanish Air Force. Spain selected the F-5 after a competitive evaluation that lasted more than two years.

Spain is the eighth country scheduled to receive the versatile F-5 for modernizing its air arm. The F-5 is also in large-scale production for the U.S. Department of Defense Military Assistance Program. Both F-5A single-seat and F-5B two-seat models are produced by Norair at Hawthorne and Palmdale.

Club News

ART CLUB

Nortronics Anaheim Art Club members continue to hold regular live model painting sessions every other Wednesday at the NRC Clubhouse, Anaheim.

Professional and amateur artists are invited to take part, according to Commissioner Ed Mosher.

Future plans include a free movie and painting exhibit slated for May 15 at the Clubhouse. Information is available through Mr. Mosher, ext. 1055, Anaheim.

* * *

TABLE TENNIS

Nortronics Anaheim's annual table tennis tournament has been scheduled for Sunday, March 14 at the Brookhurst Junior High School, Anaheim.

Action will be from 1 to 5 p.m. with singles (double elimination), singles consolation and round-robin doubles events.

Entry fee is $1 per event with trophies going to first and second in each event. Deadline for entering is March 11, Commissioner Jack Flannagan reports. Entry blanks are available at Personnel Activities offices.

* * *

BOWLING

An open invitation to all Northrop personnel, their families and friends, to enter the Nortronics NRC Scotch Doubles bowling tournament slated for March 14 has been issued by Commissioner Chet Guzinski.

Keglers will roll from 10 a.m. to noon and from 2 to 4 p.m. at Carter Bowl, Fullerton, located between the Riverside Freeway and Orangethorpe Ave.

* * *

CAMPERS

Fish were caught, but no gold panned, February 27-28 when the NRC (Hawthorne) Camping activity held its first camp out of the year at Camp Williams.

The 68 people taking part fished or panned for gold in the San Gabriel River and enjoyed a pot luck dinner in the evenings.

Regular business meetings are now held the first Monday of each month at the Plant 3 cafeteria, Hawthorne.

* * *

RADIO CLUB

Code classes for beginners are now being formed as part of the operations of the Northrop Nortronics Radio Club at Hawthorne.

Regular monthly meeting now slated will be March 16 at the Plant 3 cafeteria with visitors welcome.

NORTHROP HOSTS DISCUSSIONS ON OPPORTUNITIES

Northrop Corporation, an original signer of the 1961 Plan for Progress, last week hosted a special conference to further the national program.

Basically, the Plan for Progress is a voluntary effort of defense industry firms to encourage and support Equal Opportunity Employment. Each firm coordinates its in-house efforts and supports the national effort as needed.

William Larrabee, Corporate vice president—Industrial Relations, was host at the March meeting. Attending were Industrial Relations directors from all Northrop divisions as well as invited guests from other aerospace firms.

Special participants were P. B. Lewis, administrative director, and Don M. Thomas, administrative coordinator, Plan for Progress, Washington, D.C.

Astronauts Prepare For Gemini Flight

Ventura Division's parachute landing system for the Project Gemini program draws one of its most important assignments late this month when it returns America's first two-man spacecraft to an Atlantic Ocean recovery area after three orbits around the earth.

Astronauts Virgil I. (Gus) Grissom and John Young will be rocketed from Cape Kennedy aboard a Titan II launch vehicle. The shot will be the first manned flight since conclusion of NASA's Mercury program.

FUTURE

(Continued from Page 1)

abroad—and it is succeeding—it will open doors and many opportunities for other parts of our Company," Mr. Jones said.

Mr. Jones added that recent realignments in the Corporate structure will provide operating divisions with sound approaches to realistic and competitive costs and to marketing approaches that are realistic in a highly competitive environment.

CREDIT UNION

(Continued from Page 1)

going officials over the past year.

"Each of these individuals has served faithfully and with distinction during a period in which the Credit Union handled record deposits and loans," Mr. Cripe said.

Among innovations introduced for the first time during the past year were loans for the purchase of trailers.

Northrop Credit Union is open to all employees of the Corporate office, Norair, Northrop Space Laboratories and Nortronics West Coast employees. Ventura Division operates its own Union.

Membership fee is only $1 and shares sell for $5 each.

Information on the Credit Union is available through Industrial Relations outlets at each Northrop facility or through the central Credit Union office located at Norair, ext. 617.

ANAHEIM WOMEN PREPARE TO SHOW SPRING FASHIONS

Northrop employees interested in viewing the latest spring fashions are invited to to so during the Nortronics Anaheim Women's Club spring fashion show.

The Club's biggest event of the year entitled "Fashions En Route" will be held on March 27 at the Newporter Inn in Newport Beach. Time of the show is 12:30 p.m.

Tickets for the luncheon and show are $3.25 and may be obtained from Esther Jones at Anaheim or Millie Muller, ext. 472 at Hawthorne.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California Vol. 23, No. 3 March 24, 1965

System Goes Airborne to Track Echo I

An airborne navigation system, originally developed by Nortronics Division (Palos Verdes) for missile guidance, has been proven successful in tracking space vehicles and satellites.

The announcement was made this week following evaluation of data received from an Air Force Systems Command satellite tracking program, conducted by Nortronics.

Using Echo I as a target, the Northrop astro-inertial navigation system far surpassed ground systems in accurately following the satellite. The program consisted of five flights over the Western Test Range.

The tracker, which locked onto Echo I by reflected sunlight, operated in a C-131 transport plane flying from Hawthorne Municipal Airport.

Stellar navigation was employed from take-off until the satellite was in range. Then the system was switched to inertial operation as the tracking mechanism began to function.

Nortronics originally developed the navigation system to guide the Skybolt missile. Principal modification was replacement of a phototube sensor with a Vidicon unit to obtain a larger field of view for more rapid acquisition.

By combining azimuth and elevation measurements made by the star tracker with satellite trajectory computations pre-programmed into the system's airborne computer, the test aircraft estab-

(See ECHO, Page 6)

DEADLINES FOR NEXT EDITION

News, Features	March 30
Club Activities	March 31
Photos	March 31
Classified	March 31

Further details on who to see, how to see them on page 5.

INKING A NEW CONTRACT—Occasion is obviously a happy one as Nortronics Division executives sign contract for $7.3 million to produce Test Evaluation and Monitoring Systems (TEAMS) for U.S. Navy Bureau of Ships. They are, from left, Dr. William L. Parker, director of Marketing, Ross Miller, vice president and manager—Technical department, W. P. Van Ordstrand, program manager.

Materials Research Leads To New Radome Potential

An independent research and development program in composite materials has led to Northrop Ventura's first contract for the manufacture of radomes and has excellent planned potential as a major product line, according to John Kerr, director of Product Engineering in the Production Operations department.

"While contract details cannot be announced at this time," Mr. Kerr said, "we are proud to say that we have had excellent results in all phases of testing, and that our achievements have aroused a great deal of enthusiasm among radome users."

The radome, which actually is as old as radar, is a protective cap on guided missiles and aircraft which protects radar guidance systems against heat and rain, and actually becomes a part of the system through its electromagnetic characteristics.

Less than a year ago, when Mr. Kerr and a four-man Production Operations team launched the program, high speed missiles were encountering operational difficulties in rainstorms and in situations where high frequency was required for guidance.

The Northrop Ventura radome offers excellent protection from both rain erosion and heat of high speed flight and takes a wide band of radar frequencies with outstanding transmission properties, Mr. Kerr said this week.

"And our product is less than one-half the weight of existing designs," he added.

These made-to-order characteristics are possible through development of a ceramic cap backed up by thermo-setting plastics.

Ceramic material provides the necessary protection and posses-

(See RADOME, Page 6)

BUT HE WINS HIGH JUMP

Hofmayer vs. Rattler: A Draw

Apparently the "battle" ended in a draw with both "contestants" profiting.

Nortronics Division's Ed Hofmayer has updated his knowledge of reptiles and is quite certain he set some sort of unofficial standing high jump record. And somewhere in the hitherlands there is a five-foot rattlesnake with a sore head and a firm conviction a hasty withdrawal is still the best policy.

Mr. Hofmayer, Earl Chambers, Del Mott, Gene Jessick, Bill Cornett and Dick Browder of Nortronics, along with Tony Brooks and Mike Craig of two local military organizations were in a remote area of Southern California on a survey mission last week.

En route, the talk got around to snakes and Mr. Hofmayer advised the group they had little to fear from rattlesnakes, since they traditionally are still in hibernation at this time of the year.

That was before he stepped right in the middle of a slumbering five-foot rattler.

Mr. Hofmayer executed his now-legendary leap up and down a steep incline, while the snake made a jump in the same direction. Both came to rest almost face-to-face. This time Mr. Hofmayer led in the respective evasive action maneuvers.

Mr. Chambers bounced a handy rock off the snake before it slithered down a hole.

Mr. Hofmayer was unhurt, although his pant leg bore the signs of snake venom.

The remainder of the survey mission was uneventful, although the party found pages from an October 29, 1931 Los Angeles Times with a full-page painting and a poem authored by Mrs. Calvin Coolidge. They also found other newspapers from the 1930's, numerous cattle bones, an old shack and the crumbling walls of an old adobe structure, presumably an old way station for the Butterfield Stage line that once crossed the area.

Nortronics Gains $7.3 Million Job For Test Systems

A $7.3 million contract for automatic test and checkout systems has been awarded to Nortronics Division by the U.S. Navy Bureau of Ships.

Designated TEAMS, for Test Evaluation and Monitoring Systems, the equipment is designed to assure continuous operation of critical electronic equipment aboard a new class of destroyer escorts.

The system will provide on-line monitoring of up to 10 major electronic systems aboard each vessel. The Bureau of Ships contract covers design, production and installation of the checkout systems aboard the ships.

Units will be similar to Northrop DATICO automatic checkout systems, which monitor Polaris missile system readiness, W. P. Van Ordstrand, program manager, said this week.

However, the new equipment will use integrated circuits exclusively in the logic section. The switch to microelectronics was made primarily for gains in speed of operation and reliability, Mr. Van Ordstrand added.

Manufacturing is scheduled for the Anaheim plant, following successful design and tests of a pre-production unit, he said.

Key technical support is being provided by senior engineers C. C. Sommerfeld and M. S. Allison, sr.; engineering specialists J. R. Lulofs, D. R. Behrens and A. A. Yoder; Project Engineer H. L. Withee, and A. J. Flint, test coordinator.

NORTHROP REPS SHARE IN TWIN CAPE SUCCESSES

Jubilant technical representatives of Ventura and Nortronics Divisions and Northrop Space Laboratories were sharing congratulations at Cape Kennedy Wednesday after 72 eventful hours climaxed by the near perfect Gemini space flight Tuesday.

At the moment a Northrop Ventura parachute system was settling astronauts Virgil Grissom and John Young in their Atlantic Ocean recovery area (only 25 miles off target), Ranger 9 was a little more than 50,000 miles from impact on the moon.

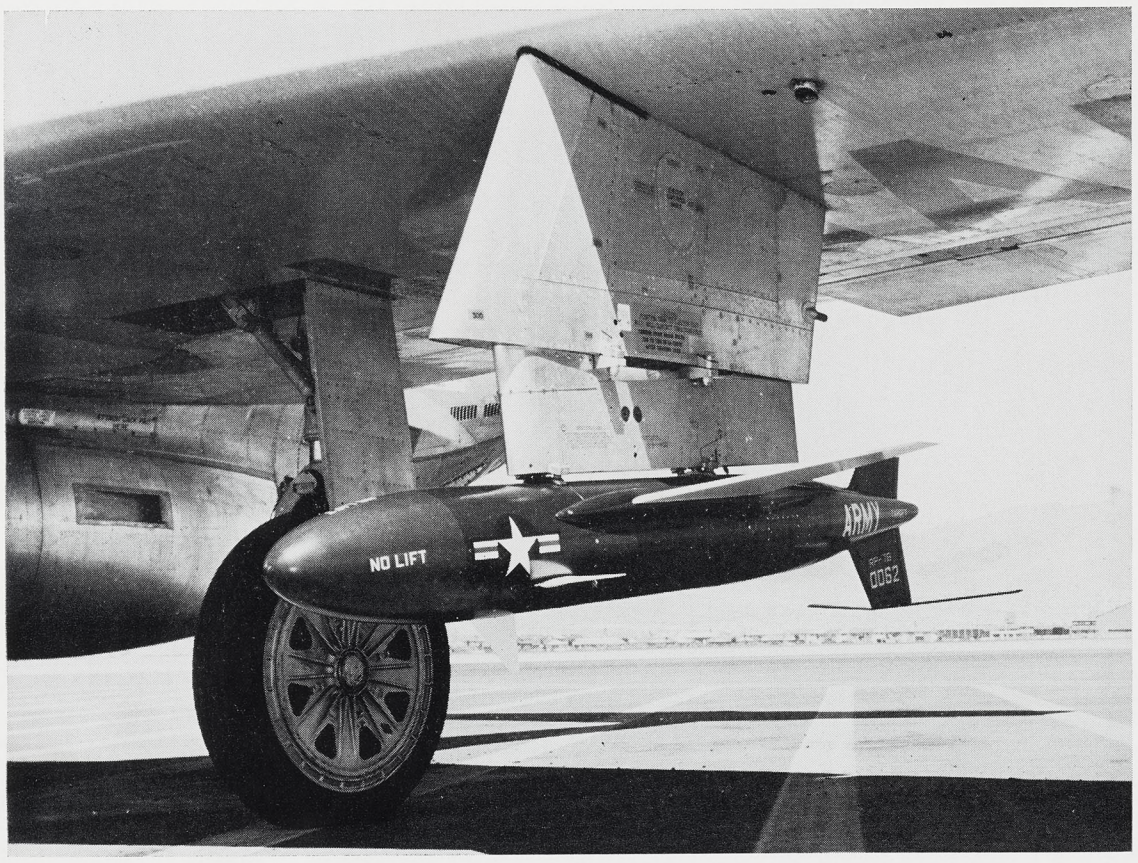
When Ranger 9 soared off in a perfect launch atop an Atlas-Agena rocket Sunday, a Nortronics/NSL team was present. Tuesday morning Ranger 9 was virtually assured of success after a ticklish mid-course maneuver was completed as scheduled.

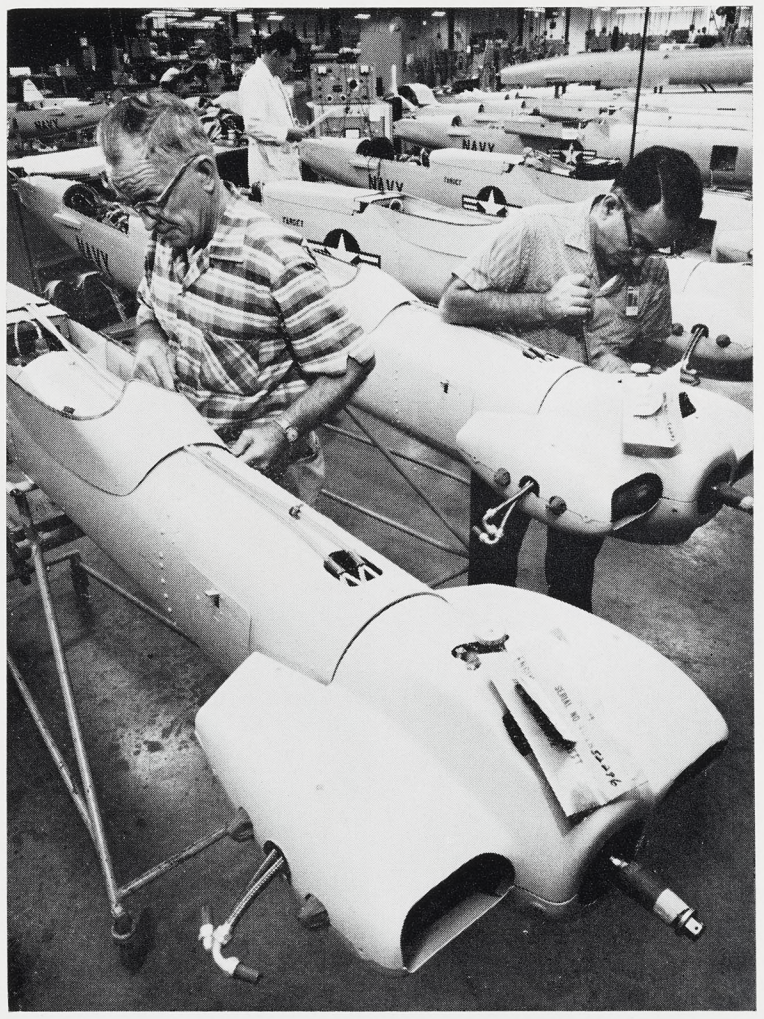
Six Northrop Ventura representatives were on hand for the two-man Gemini flight, delayed one day because of the Ranger shot. Thousands of other Northrop employees were able to keep posted (along with the rest of the world—via all network television—on the Northrop built landing systems as it gently delivered astronauts Virgil Grissom and John

(See CAPE, Page 6)

NARROWING THE FIELD—As blast-off time nears at the Cape, responsibility for safe recovery of Gemini astronauts narrows from the scores of manufacturing and inspection personnel at Ventura Division to the one man who packs the parachute. Larry Richardson (kneeling above), Northrop Ventura representative at the Cape uses hydraulic equipment to pack chute for Grissom-Young flight.

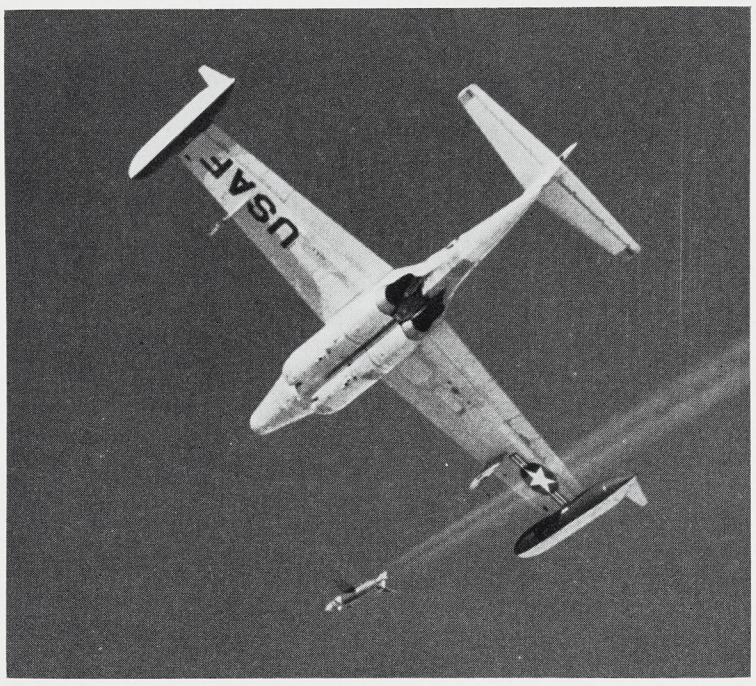
Ventura Target Service Emphasizes Realism





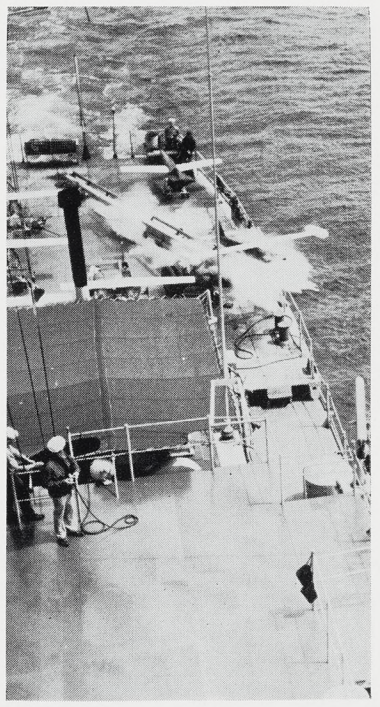
DRONE NESTING

Ready for air launch, the AQM-38A rocket-powered target missile (above) will be launched at altitude in order to provide realistic training for U.S. Army Nike and Hawk crews. Formerly designated RP-76, the Northrop Ventura target is radio controlled and recovered by parachute. Target is launched (right) and while only 10 feet long, it will simulate enemy bomber on radar screen of alerted missile crew on ground down range. Ventura Division not only produces the aircraft, but provides complete flight service including launch, recovery and maintenance.

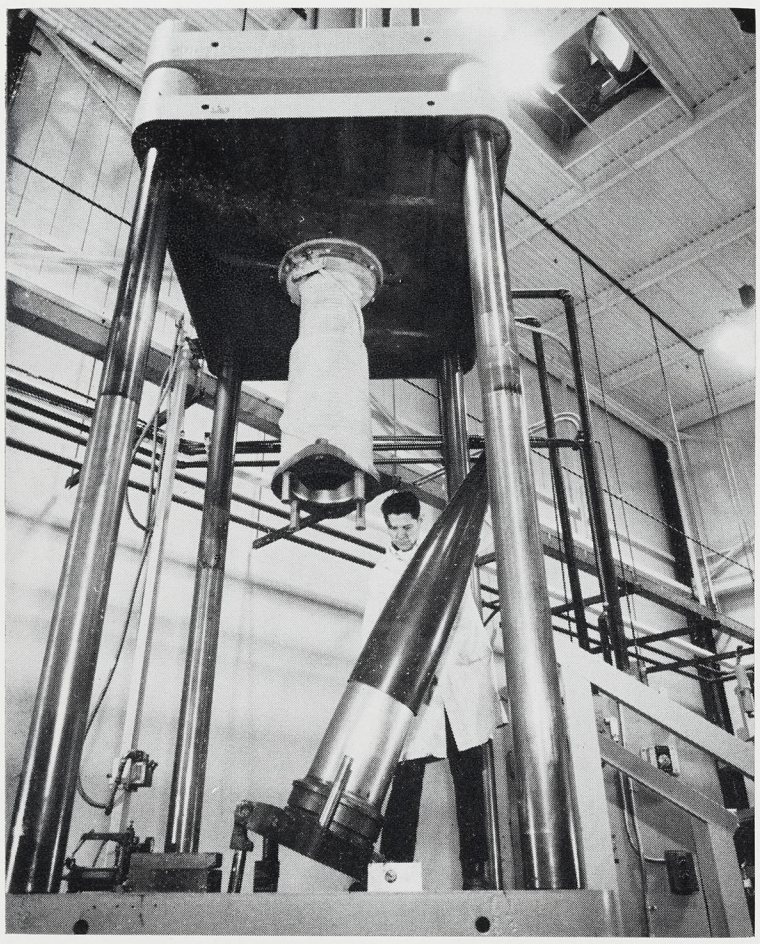


'CARRIER' BOUND

Fuselages of KD2R-5 drone, popular Navy target, near completion (above) at Ventura Division. Special launcher gets propeller-driven target airborne (right), and another is moved in to take its place (below). The KD2R-5 and AQM-38A are only two of a family of radio-controlled drones produced at Northrop Ventura's Conejo Valley facilities.



Story on Page 3



NOSE CONE FOR A DRONE

Nose cone for AQM-38A emerges completely finished from hydraulic press in the plastics manufacturing section of Ventura Division. The target missile is built entirely of plastic except for its control system and solid propellant rocket engine.

Steady Sales Are Forecast For Drones

There will continue to be a steady market for target drone aircraft as long as the military—both in the U.S. and abroad—maintains an arsenal of conventional weapons, according to Ralph Friesen, program manager for drone projects in Northrop's Ventura Division.

Mr. Friesen

Mr. Friesen currently is directing activities on a $903,000 follow-on contract with U.S. Army for production of the AQM-38A (RP-76).

As a high or low altitude aerial target for surface-to-air and air-to-air missile systems, such as the Army's Nike and Hawk units. the AQM-38A is now one of the primary products of the Ventura drone program.

Weighing 300 pounds and only 10 feet long, the rocket-powered AQM-38A can be carried aloft by fighter aircraft and launched from altitude.

Despite its compact size it simulates the radar cross-section of a full sized enemy bomber, providing the most realistic anti-aircraft training possible.

While the latest Army contract calls for production of the rocket drones, the heart of the Ventura program is its complete target flight service, in which Northrop supplies, maintains, flies and tracks the targets during military training exercises.

More than half of the rocket drones have been recovered and repaired for re-use since the operation was begun in 1958.

"This represents a tremendous savings to the Army," Mr. Friesen said, "and makes the AQM-38A the least expensive supersonic target system in operation today."

The AQM-38A is expected to remain a primary target for at least another five years, Mr. Friesen added.

Rod Hoover is supervisor of the newest AQM-38A contract.

REMEMBER WHEN?

AND TIME MARCHES ON — Airframe static tests at Norair yesteryear are shown in photo taken 20 years ago of P-61C outer wing panel. Kirksite pigs and shot bags (lead filled) on wing provided test loads. Weights on wing totaled 55,000 pounds. Four of men pictured are still with Norair. Can you spot Harvey Baker, Rollie Pontious, Lou Yancey and Ray Veverka?

PROGRAM SIMPLIFIED

F-5 Cinches Airframe Static Tests

Norair Division passed another major F-5 program milestone recently with the successful completion of extensive airframe static tests on both F-5A and F-5B configurations.

No significant incidents or failures of primary structures occurred during the program. In short, the airframes qualified without structural modification for 100 per cent of ultimate design, flight and ground handling loads.

Tests were performed in the Norair Engineering laboratories and date back to October 1963.

Requirements were established by the Structures and Mechanical Systems branch under Lou Yancey, chief. Stan Murnane of the T-38/F-5 Structural Analysis branch helped with test requirements and customer approval of test conditions and test results.

The F-5 static test program was carried out in an unusual manner in the interest of accelerating schedules and reducing costs, according to R. B. Jackman, chief of Engineering Laboratories.

Traditionally, aircraft static tests are carried out on complete aircraft (wings mounted to fuselage, etc.). Wing loads are reacted by fuselage loading distribution and vice versa for all major test conditions. This entails careful analysis of balancing loads and additional reaction control points to maintain load balance within acceptable limits. And tests must be performed in logical order with one completed before another can begin.

Norair conducted tests with the F-5 wing mounted on a fixed reaction structure utilizing fuselage attach points, eliminating the requirement for balancing reaction loads.

Conversely, fuselage tests were carried out in a similar manner on another fixed structure. Loads were reacted at the wing attach points.

Major conditions critical for the wing and fuselage interaction were tested with the wing and fuselage mated.

"This technique permitted conducting the entire test program in a relatively simple manner," Mr. Jackman said. "Final mated testing for critical conditions completed all test requirements."

Mr. Jackman pointed out new techniques saved Norair and its customers approximately 18 weeks and 4500 man-hours as compared with previously used test methods.

All F-5 components common with the T-38—ailerons, trailing edge flaps, horizontal and vertical tails, seats, various control systems — were qualified earlier during the static test program for the T-38A.

Similarity of the F-5A and F-5B allowed a single test program to satisfy major requirements for both configurations. Exceptions were forward fuselage tests on the two-cockpit configurations which were required to satisfy the F-5B test requirements only.

New Page Contract

The United States Army Materiel Command has awarded Page Communications Engineers, Inc., Northrop subsidiary at Washington, D.C., a contract valued at approximately $2 million for improvement of a troposcatter communications systems between Taiwan and Clark Air Base in the Philippines.

Richard L. Jones Named Research Director at Norair

Dr. Richard L. Jones has been named director of the Northrop Norair Research and Technologies section by W. E. Gasich, vice president and assistant general manager-Technical.

Dr. Jones reports to D. D. Warner, manager, Research and Development department.

Joining Northrop in 1961, Dr. Jones served as a senior research scientist in Materials Research group and since April 1962, has been chief of the Materials Research group.

Dr. Jones holds a B.S. (1952) in metallurgy from Wayne State University and earned his M.S. (1953) and doctorate (1958), also in metallurgy, from the University of Michigan.

BRATT, MIKUS GET TECHNICAL POSTS

W. E. Gasich, Norair vice president and assistant general manager-Technical, has named two men to new Technical posts.

R. W. Bratt, formerly of the Technical staff, is now project director, X-21A Project Engineering section, reporting to the manager, Dr. L. R. Fowell of the X-21A and M-2/HL-10 Program department.

Dr. E. B. Mikus was named chief of the Materials Research group, reporting to Dr. R. L. Jones, director of Research and Technologies section.

Radio 'Hams' Elect Holly Commissioner

Bob Holly has been elected the first commissioner of the new Northrop Ventura Amateur Radio Club.

Twenty - four — seventeen of which are licensed amateurs — employees gathered last week to charter the Club.

Other officers elected were Frank Bennett, vice commissioner; Lois Burmahln, secretary; and Don Daniel, activities manager. The Club has its own radio equipment and an operating fixed station on all bands.

Anyone interested in applying for membership in the Club can do so by attending one of the monthly meetings held at 11:30 a.m. in Room E166 or by calling any of the Club officers.

TICKETS GO ON SALE FOR DISNEYLAND NIGHT

Northrop Corporation's annual "Night at Disneyland" has been set for Friday, May 28, between 7:30 p.m. and 12:30 a.m.

This is second annual all-for-one affair sponsored jointly by Northrop Recreation Clubs. Last year 9500 people took part.

Here's how it works:

Tickets sell for $3.75 per person. They entitle the holder to admission and free use of all Disneyland facilities and attractions, exclusive of shooting galleries. So for one price an individual can avail himself to everything Disneyland offers, including dancing to a name band and admission to the world-famed Tiki Room.

Disneyland will be cleared of non-Northrop employees prior to the 7:30 p.m. time.

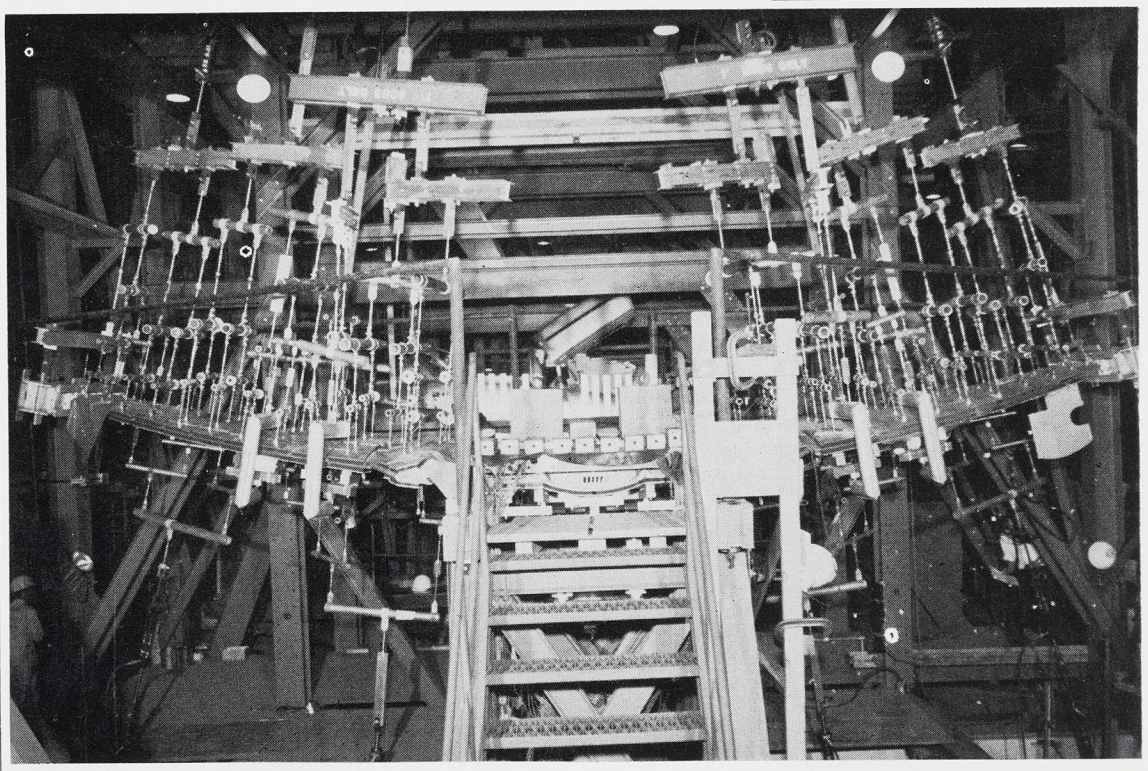
Because the May 28 date is a part of a long weekend (a holiday falls on Monday), advance notice is being given. Tickets went on sale this week at all Personnel Activities offices throughout Northrop Corporation.

CUSTOMER RELATIONS APPOINTS TAPPER

New senior Customer Relations representative at Northrop Norair is Thomas T. Tapper, according to Daniel Darnell, jr., manager of Customer Relations.

Mr. Tapper replaces Charles "Casey" Finnegan who has been re-assigned to the Flight Test section.

A 12-year Air Force veteran and rated pilot, Mr. Tapper is a former instructor pilot, member of worldwide champion AF gunnery teams and Korean combat pilot. He holds a B.A. degree in economics and psychology from San Diego State College.



CAN YOU FIND THE F-5?—Test fixtures make metal cocoon for F-5 during exhaustive airframe static test program just completed. This is final phase with wing and fuselage mated. Earlier test checked each separately. Tube-like units are part of whipple trees attached to bonded wing surfaces on one end, hydraulic cylinders on other. Cylinders, a part of loading system, are joined to elaborate instrumentation recording system to obtain pertinent stress and deflection data.

Northrop Donors Tops With Three Youngsters

Statistics covering the Northrop Blood program are common and oft-repeated.

Periodically, they tell of 300 or more volunteer donors turning out to give blood. Others tell how the program disburses from 20 to 25 pints each month to help all Northrop Corporation employees and members of their families who have a special need.

But there is another side to the program, a warm and human side often overlooked. It is the personal story of those who needed the assistance of the program and found it ever-ready to help.

Such is the story of three Northrop youngsters.

Sally Vigil, 12, Laura Jean Maki, 11, and Tommy Bates, 9, have never met. Chances are, they never will.

However, they share common bonds. Each is vitally occupied with the pursuits of a preteenager. Each has known adversity and trials beyond his years. And each owes a debt of gratitude to unknown donors who make the Northrop Blood program possible.

Sally

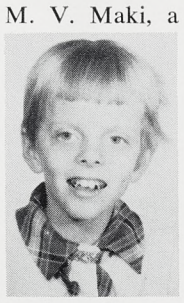
Sally Vigil is the daughter of Norair's Ed Vigil of Raw Stock Cutting.

The Vigil family had no indication of pending problems prior to a medical examination which revealed Sally had a "heart murmur."

Last November, at UCLA Medical Center, she was in open heart surgery for eight hours. It was a complete success. Fifteen days later she was back in school, playing with all her companions.

Sally required and received from the Northrop Blood program 23 pints of blood. It could have added another $575 to the Vigil family medical bills, but was available without cost.

Laura Jean Maki, daughter of M. V. Maki, a sheet metal mechanic at Norair, suffered from a rare disease known as amyotonia congenital, related to muscular dystrophy, but not the same.



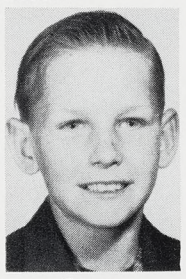
Laura Jean

Laura went through a series of three operations at Rancho Los Amigos Hospital during 1964, receiving from the Northrop program 12 pints of blood. Her surgery was for a spinal fusion to correct a curvature of the spine.

"Our daughter is now convalescing and doing fine," Mr. Maki reports. "She is looking forward to buying a poodle for which she has been saving for over a year."

The Northrop program saved the Maki family $300.

Tommy Bates is the grandson of Norair's Charles Simmons, who has received 10 pints of blood.



Tommy

Tommy lives with his grandparents and somehow managed to find a can of lighter fluid which he ignited with a match. He suffered third degree burns, critical burns over his face, neck and chest.

At Los Angeles County Hospital he was given extensive treatment which continues now in the Simmons household. However, Tommy is recovering.

In each of the three cases cited, blood was the difference between life and death. It was readily available and remains available, if more is needed. Hundreds of similar cases are on file in the Blood program office.

During April, solicitations will again be made for volunteer donors who will give blood during a May 11 bloodmobile visit.

WALK THE SUPERSONIC LINE—Twenty-four members of Norair Management Club-sponsored Junior Achievement firms are shown touring T-38 and F-5 assembly line. Tour was part of annual visit that also included dinner, talks and Charter presentations. Hosts were Club advisors who have worked with youngsters since last fall.

24 J-A Members See Aircraft Assembly Line

Twenty-four members of Junior Achievement companies sponsored by the Norair Management Club enjoyed a "big day" last month when they turned out for their annual visit to Norair.

The youngsters toured the Norair factory, ate dinner, viewed special motion pictures, received their Junior Achievement Charters, and heard brief talks by F. W. "Bob" Lloyd, vice president and assistant general manager-Operations and T. L. McCarthy, manager of Administration.

Taking part were the Norair advisors who have worked with the youngsters since they organized their firms last fall. Coordinator for Junior Achievement activities for the Management Club is Rollie Pontious.

Leo Sacks, retiring Club president, was on hand to present the Charters to Mike DeDonato, president of the NORCRAFT firm, and Tom DeFloria, president of NORDESCO.

Both firms are showing excellent results for their efforts this year, Mr. Pontious reports.

NORDESCO members have manufactured and marketed a pencil holder, while NORCRAFT members have turned out and sold traffic safety blinker units.

Library of Congress Center Offers Help In Obtaining Data

An unusual "where to go" service for scientists and engineers with particular problems may be of general interest to Northrop Corporation employees.

This service is available through the National Referral Center for Science and Technology, Library of Congress, Washington, D.C.

While the Center does not process or disseminate scientific and technical data, it guides those with specific needs to appropriate resources, including technical libraries, abstracting and indexing services, data and document centers, professional societies.

Now in its third year of operation, the Center maintains extensive records on sources and also publishes a new "Directory of Information Resources in the United States."

Hawaii Tour Lures Ventura Group

A group of lucky Northrop Ventura employees and their families have fallen to the "lure of the islands" by taking part in a group tour now in progress.

The tour, sponsored jointly by Northrop Ventura and Litton Recreation Clubs, departed March 19 and will terminate March 28.

Taking part from Ventura are Mr. and Mrs. Jack Markowitz, Mrs. Marjorie Raine and daughters, Pamela and Debra, Mrs. Lois Burmahln and daughter, Carol, and Mr. and Mrs. John J. Lawrence.

John Lawrence was tour coordinator for the Northrop group.

Valley Execs Assess Scout Program

Approximately 70 executives from Centinela Valley business and industry met at Norair Division March 17 to assess progress made in the past two years with Special Interest Exploring, a new movement in the Scouting field.

Northrop was not only instrumental in getting the program started in the Hawthorne-Inglewood area, but presently sponsors two of the 10 existing posts. Norair's manager of Administration, T. L. McCarthy, is Centinela District chairman.

The program is designed to give youths in the 16-17 age group an insight into different aspects of business and industry. The posts meet twice monthly at plants of sponsoring organizations to hear lectures and participate in group projects.

Norair Division sponsors groups in industrial management and aerospace science and engineering.

Within the two major subject areas, the explorers may choose such special subjects as computer technology, taught by Bill Justice, and lasers, taught by NSL's Dr. B. J. Stallwood.

At the colloqium last week, W. E. Gasich, Norair vice president and assistant general manager-Technical, told businessmen that "it is time to see if we can double or triple" the present program.

Other organizations sponsoring posts include: City of Hawthorne (public safety), Inglewood Kiwanis (medicine, law and air transportation), Pacific Telephone (communications), Aerospace Corporation (space science), Garrett Corporation (science), North American Aviation (air industry), and Public Relations Society of America (public relations).

NORTHROP NEWS

Vol. 23 No. 3

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

Nortronics, Norair Progeny Pace Western Days Voting

At the mid-point of a nine-week contest, a "royal" pair of Northrop youngsters are out front in balloting for King and Queen of the Hawthorne Elks Lodge Frontier Days celebration to be held in May.

Northrop youngsters Sandra Shearer and Gary Martin await results of Frontier Days Carnival voting.

They are Sandra Shearer, daughter of Norair's Russell W. Shearer of Shipping, and Gary Martin, son of Bernice, Norair Traffic and Ray Martin, Nortronics Receiving.

The winsome duo is being sponsored by the Hawthorne Odd Fellows Lodge and are competing against 12 other teams of contestants for the big honors.

Coronation ceremonies will occur April 17 at a Coronation ball slated for Hawthorne's Memorial Auditorium. Winners will then reign during the Frontier Days carnival and rodeo in May. The rodeo, sanctioned by the Rodeo Cowboy's Association, will be held May 8 and 9.

Frontier Days festivities will be centered at Crenshaw and 120th Street on Northrop property.

Norair's Personnel Activities office is handling tickets. Those for the Rodeo sell for $1.50, $2.50 and $3.50. Each ticket sold for the rodeo, the western dance during Frontier Days or the coronation ball is another vote.

Big Gem, Mineral Show Promises Outdoor Fare

Northrop Recreation Gem and Mineral Club will hold its big event of the year Saturday and Sunday at the Norair Product Display building, 3901 W. Broadway, Hawthorne.

This is the group's sixth annual show and will feature the theme "Western Trails to Gemland."

Operating hours are 10 a.m. to 10 p.m. Saturday and 10 a.m. to 6 p.m. Sunday. Ample parking will be available and the entire show is free.

This annual event normally attracts some 4000 to 5000 visitors and features the crafts of approximately 150 amateur lapidary workers, plus a wide assortment of commercial items, special displays, entertainment, and films.

Lapidary equipment of all types will be on display and in operation. One special area will be set aside for the display of the very latest type of campers, camping trailers and various trail vehicles.

Invited dealers will also show modern developments in lapidary equipment.

A snack bar will be in operation and door prizes presented each hour, with added donation awards presented on the final day of the show.

"This is our biggest public show of the year and attracts some outstanding exhibits, dealers, etc.," say NRC Commissioners Dan Kozlow and Lyle Claypool. "For the family or individuals interested in the outdoors, this show is a must, since it offers such a wide range of attractions."

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Oldsmobile F-85, 1961, 4-dr. sedan, p/s, $1199. Manhattan Bch., FR 2-0307. A

Stereo turntable, Rek-O-Kut, walnut base, $50. L.A. 25, GR 4-9790. A

Bedroom Suite, cherry wood, French provincial, $450. Pacoima, 882-0761. A

Bicycle, 26″ boy's, 1-yr.-old, $18. P.V. Estates, FR 5-5097. A

Plymouth, 1964, 2-dr. h/top, 426 S eng., 4-spd. trans., r/h, $2350. Lomita, DA 6-6214. A

Ford, 1963, 9-pass. country sed., factory air, p/s, luggage rack, V-8, Cruise-O-Matic, $2150. Orange, 714-633-2984. A

T-Bird, 1959, $1000. Torrance, 329-2882. A

Alfa Romeo Spyder, 1962, r/h, 29,000 miles, $1200. Lynwood, 635-3784. A

Camera, 8mm movie, mag. load, Dejur Fadematic, turret model, 13mm f:1.9 & 36mm f:2.8, $50. L.A., GR 4-3433. A

Volvo 544, 1963, B-18 eng., new w/w tires, $1775. Hawthorne, 378-0158. A

Corvette, 1958 270-hp, stick, chrome wheels, $1500. Gardena, DA 4-3217. A

Acreage, 10, in Palmdale w/water rights, $2000. Inglewood, OR 2-7164. A

Formal, knee length, strapless, pink brocade, size 12, matching purse, shoes, size 6½, $20. Torrance, DA 6-2820. A

Occasional chair, Danish walnut, dk. blue, lt. blue stripes, $15. Torrance, FR 8-7642. A

Movie Camera, Bolex B8, dual turret, optical zoom-type finder, carrying case, many extras, $80. Torrance, DA 4-5135. A

Motorcycle, 1965 Yamaha YDS 3, 250 cc, $585. Norwalk, UN 4-7673. A

Volkswagen, 1963, r/h, low mileage, $1450. Hermosa Bch., FR 2-5985. A

Corvair Monza 900, 1961, 4-dr., r/h, $995. Inglewood, PL 5-6655. A

Washer, 1964 Norge 14 lb., used 6 mos., $135. Buena Pk., 828-2440. A

Home, 3-bdrm., family rm., 1¾-bath, 1 mile to Nortronics, covered patio, FHA terms, $19,250. Fullerton, 526-3702. A

BBQ, lge. oven w/rotisserie, thermostat, $15. Gardena, DA 7-0872. A

Lumber Rack, w/rigging levers for ¾-ton truck, $70. Torrance, 370-3023. A

End table set w/coffee table, Nevamar tops, dk. mahogany, $7.50. Torrance, 675-6637. A

Camera, Revere 8mm turret, leather carrying case, many extras, $100. Hawthorne, 675-8413. A

Refrigerator, Servel, gas, auto. ice server, 10 cu. ft., $75. Inglewood, PL 4-6079. A

Lathe, 36″ Craftsman, w/4¼″ swing, $35. Gardena, 324-3760. A

Borgward station wagon, 1958, needs paint, $195. P.V. Estates, FR 5-9740. A

Rambler American, 1961 4-dr., auto trans., heater, $650. Torrance, 328-5867. A

Runabout, 14′ Mark 20 motor, trailer, spare tire & tube, $200. Torrance, TE 1-3483. A

Shaver, Norelco elec., 110/220 v, new floating heads, $7. Torrance, 371-4741. A

Dodge Coronet, 1957, r/h, auto. trans., $300. Hawthorne, 676-3912. A

Ford Galaxie 500 XL, 4-spd., 390 cu. in., p/s, p/b, $1895. Gardena, FR 7-3636. A

Ranchero, 1964, new V-8 eng., p/s, 4-spd. trans., $1799. Malibu, 457-2979. A

Sofa, $10. Gardena, 323-1378. A

Transmission, 1963 Corvette 3-spd., w/linkage, $200. Torrance, 835-5052. A

Chord Organ, Hammond, w/percussion, walnut, instruction books, terms, $500. Inglewood, OS 5-7050. A

Bicycle, Derailluer 10-spd., boy's 26″, $25. Inglewood, PL 5-4497. A

Camera, 3¼ x 4¼ Anniversary Speed Graphic w/127mm f4.7 Ektar, film holders, $79. Orange, 714-KE 2-1232. A

Shock absorbers, 1-pr., Delco Superlift Air, 0-90 lbs. pressure, $20. Inglewood, OR 7-8868. A

Lot, 100x25′ ea., Big Bear, & hunter's cabin, trees, level, water & elec. avail., $3825. Manhattan Bch., FR 2-3878. A

Camera, Minox B, w/accessories, $150. L.A. 43, 293-3752. A

Bedroom Set, solid ash, natural finish, $100. Box 301. A

Washer, Kenmore, wringer-type, $35. Inglewood, 672-5578. A

Mobile Home, 12′x57′ Riviera, 1962, 2-bdrm., prov. furn., 35′ porch, 17′ screen rm., $6800. Long Bch., 428-1789. A

Washing Machine, Kenmore auto., 2-spd., $110. Inglewood, 677-4540. A

For Sale

Ford 6, 1954, station wagon, floor shift, new tires & clutch, $200. Hawthorne, OS 5-3880. A

Stove, O'Keefe & Merritt 40″, sep. broiler, chrome grill, $80. Gardena, 675-1005. A

Desk, maple, w/chair, $55. Torrance, 371-8564. A

TV, Zenith portable, 19″, 2-yrs.-old, $85. Hollydale, ME 3-2395. A

Swimming Pool, Trophy portable w/cover, 4′x15′, used 3 mos., $40. Manhattan Bch., FR 4-8036. A

Reducing Table, $20. Manhattan Bch., FR 2-0720. A

Mobile Home, 1964 Skyline 10′x50′ expando, furn., $1000 for equity. L.A. 47, 754-3962. A

Organ, 22-key multichord Thomas, $50. Gardena, 323-3898. A

Cemetery Lot, dble. interment, Roosevelt Cemetery, $600. L.A. 47, 756-4438. A

Chain Saw, David Bradley, 20″ lightweight, $100. Hawthorne, OS 5-2159. A

Pontiac, 1959, 4-dr. h/top, Hydromatic, p/s, r/h, $650. Bellflower, 867-5892. A

Couch, 7′ white Naugahyde w/zipper cushions, $45. Hawthorne, OS 5-7938. A

Apt. Bldg., 9-unit, 3-bdrm. owner's unit w/fireplace, $113,000. Inglewood, 671-8368. A

Acreage, 40 acres, air strip easement, good hunting & fishing, terms, $2995. San Fernando, 361-7541. A

Bedroom Set, dble. bed, $75. Hawthorne, OS 9-6982. A

Buick, 1950, $50. Torrance, DA 5-7139. A

Cadillac, 1961 sed. de Ville, 36,700 miles, $2275. Fullerton, 529-3416. A

House, 3-bdrm., den, 1500 sq. ft., 1¾ baths, no. of Manchester, $34,500. Playa del Rey, EX 1-4860. A

Lamp set, modern, 48″ high, $20. L.A. 66, EX 8-8805. A

Boat, 25′, flybridge dual controls, Chrysler Marine 6-cyl. eng., $1500. Hawthorne, OS 5-7729. A

Chevrolet station wagon, 1957, 4-dr., V-8 auto., r/h, p/s, p/b, $495. L.A. 66, 391-6045. A

Sewing Machine, Singer portable, $20. Torrance, DA 9-3721. A

Plymouth station wagon, 1959, p/s, $400. Granada Hills, EM 5-7338. A

Ford, 1959, 2-dr., r/h, new rebuilt eng., $450. Long Bch., NE 2-3489. A

Ford, 1961, Econoline, w/sleeper camper, $900. Hawthorne, 676-7185. A

Volkswagen, 1959 sed., new w/w tires, radio, seat belts, clock, $950. Torrance, 323-0180. A

Trailster, 8-hp Cushman, 2 sprockets, front & rear brakes, aux. gas tank, $200. L.A. 45, 645-0945. A

Chord Organ, Wurlitzer elec., 1-yr.-old, $700. Inglewood, 675-8914. A

Wedding Ring set, white gold, plain band, interlocks to ⅞ carat diamond engagement ring, $400. Bell, 585-9139. A

Lawnmower, power, 18″ reel-type, $30. Inglewood, 678-1446. A

House, 5-bdrm., 3½-bath, fruit trees, fenced yd., fireplace, $26,500. Pasadena, SY 4-3805. A

Chevrolet Impala, 1961, 2-dr., h/top, air cond., Powerglide, $1595. Box 302. A

TV, 27″ Zenith console, AM/FM, hi-fi, cherry wood, contemp. cab., $300. Van Nuys, ST 9-5791. A

Sofa, convertible, $50. Rolling Hills, 673-1097. A

VW 1500 S, 1964, sed., 3500 mi., $2050. P.V. Pen., FR 8-2105. A

Cemetery Plots, Inglewood, Greenlawn section, adjoining, $350 ea. Hawthorne, OS 6-8842. A

Dinette set, chrome, table w/leaf & 6 chairs, $45. Calabasas, 889-8091. A

Home, 3-bdrm., custom, lge. family rm., partly furn., Hollywood Riviera sect., $33,950. Redondo Bch., 378-1038. A

Toy Poodle, white, papers, 10-mos.-old, $85. Playa del Rey, 398-1458. A

Mercury, 1956 Monterey 2-dr. h/top, auto. trans., p/s, p/b, r/h, air cond., $325. Hawthorne, 676-5253. A

T-Bird, 1957, h/top, auto. trans., new paint, $1800. Fullerton, 714-LA 5-6776. A

Chevrolet sedan, 1956, Powerglide, $400. Long Bch., GA 3-1363. A

Bar, rattan, 4 ft. long, 3½ ft. high, 1½ ft. deep, 2 matching swivel stools, $59. Long Bch., 439-3658. A

Sewing Machine, Singer portable, $25. Playa del Rey, 398-3018. A

Chevrolet, 1957, 4-dr., good tires, $550. Hawthorne, OS 5-2000. A

Sunbeam Alpine, 1962, r/h, w/w, tonneau cover, $1325. Beverly Hills, CR 6-4879. A

Bicycle, girl's 26″, recond., new tires, $18. Gardena, DA 4-8853. A

House, 4-bdrm., 1½ bath, fireplace, schools, $1000 dwn., $17,950. Rolling Hills Est., FR 5-8778. A

Ironer, Ironrite, $95. San Pedro, TE 1-2973. A

Home, custom built 4-bdrm., 3-bath, tri-level, modern, o/sized family rm., fireplace, landscaping, $49,950. Lawndale, 370-6406. A

Wanted to Buy

File Cabinet, 4 or 5 drwr., letter or legal size metal. Los Alamitos. GE 1-4233. B

TV, 21″, Early American cab. Hawthorne, 675-8262. B

For Trade

Triumph rdstr., tonneau cover, soft top, trade for station wagon not older than 1955. Hawthorne, OS 6-5101. C

Rentals Offered

Exec. Apt., 3-bdrm., 1800 sq. ft., family rm., 3-bath, fireplace, adults, sub. parking, $300. Inglewood, 373-1143. E

Apt., 1-bdrm., unfurn. $85 mo. Torrance, DA 9-0314. E

Apt., 2-bdrm., 2 baths, fireplace, laundry serv. avail., storage space, play yd., 2 children OK, near Norair, $135 mo. Hawthorne, 679-1358. E

Room, laundry avail., $12. wk. Lawndale, 371-6775. E

Sleeping Rooms, walking distance to Plant I, $9-$10 wk. Lawndale, OS 5-5850. E

House, $115 mo. Gardena, 324-5961. E

Apt., unfurn., lge. 2-bdrm., all extras, closed gar., lge. pool & patio, near El Camino College, $125 mo. Torrance, DA 9-5986. E

Apt., 1-bdrm., 15 min. to Northrop, laundry, gar., adults, $90 mo. Redondo Bch., 379-4628. E

Share home 1 blk. from beach, 1 child OK, $25 wk. Manhattan Bch., FR 9-5044. E

Studio Apt., 2-bdrm., near Northrop, 1½-baths, children OK, $125 mo. Hawthorne, 679-7551. E

Apt., 2-bdrm., owner unit, $150 mo. Hawthorne, OS 6-7417. E

Apt., 2-bdrm., unfurn., thermo heat, carport, water & trash pd., $100. Torrance, 320-2827.

Apt., 2-bdrm., heated pool, 1½-bath, $160 unfurn., $190 furn. Playa del Rey, 397-7656, 397-7673. E

House, 2-bdrm., redecorated, laundry rm., near Northrop, tile kitchen & bath, $105 mo. Hawthorne, OS 5-9695. E

Apt., 1-bdrm., pool, $90 mo. Redondo Bch., 376-2117. E

Apt., all elec., 2-bdrm., 2-bath, carpets, pvt. patio, closed gar., free wash & dry, $145 mo. Torrance, 370-4778. E

Apt., 3-bdrm., carport, $118. Long Beach, 422-6169. E

Bachelor Cottage, furn., util. pd., completely redec., $75 mo. Gardena, DA 4-0161. E

Apt., 1-bdrm., stove & ref., gar., adults only, no pets, near Northrop, $80 mo. Hawthorne, 676-1985. E

Rentals Wanted

House, 3-bdrm., in or near Hawthorne, by April 7, have 2 children. Hawthorne, 676-2858. F

Personals

Desire passengers to share costs of occasional light plane flights between Hawthorne & San Diego. Box 303. L

Opportunity to obtain pvt. license at min. cost as pt. owner of late model aircraft. Rolling Hills Est., FR 7-3810. L

I would like to thank all my friends at Northrop for their concern & acts of thoughtfulness during my illness & convalescence. FRED FARNER. L

For Sale or Trade

Front Axle, wheels, tires, 16 x 6.50, from 1-ton Ford pickup, $35 or trade for fencing or building mat'l. Canoga Pk., DI 8-3100. M

Falcon station wagon, 1961, 4-dr., deluxe, auto., big eng., r/h, new tires, $950 or trade for VW of equiv. value. Torrance, DA 5-7705. M

Minnie Bike, 3-hp Briggs & Stratton, $65 or trade for bd. tenor sax. Gardena, DA 4-7209. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Torrance & Hawthorne Blvds., Torrance. Lela Love, exts. 1834, 2133, 328-7234. 2

8 a.m. — 4:45 p.m.

Beverly Glen & Santa Monica Blvds., Los Angeles. J. W. Murphy, ext. 1522, GR 4-3433. 5

Blackstock & Los Angeles Sts., Simi Valley. B. I. Johnson, ext. 2844, 257-1760. 5

Orange Ave. & Del Amo, Long Beach. W. H. Covert, ext. 2721, GA 3-1363. 5

Rides Offered

8 a.m. — 4:45 p.m.

Wilshire & Crenshaw Blvd., Los Angeles. Cliff Spindel, ext. 518, 519, HO 5-8023. 15

Orange Ave. & Del Amo, Long Beach. W. H. Covert, ext. 2721, GA 3-1363. 15

Blackstock & Los Angeles Sts., Simi Valley. B. I. Johnson, ext. 2844, 257-1760. 15

PEOPLE OF YEAR

(Photo courtesy Conejo News)

Conejo Valley Chamber of Commerce held its annual dinner at Northrop Ventura cafeteria last month, with Rex Fairless (right), director of Industrial Relations at Ventura Division, presiding. Mr. Fairless, who is president of the Chamber, chats above with Marvin Burow, manager of Thousand Oaks Security Bank, Mrs. William Rothschild and Mrs. Dwight Houser, both of Thousand Oaks. Chamber gave its Woman of Year award to Mrs. Rothschild. Mrs. Houser accepted Man of Year award on behalf of her husband.

NO NEWS FROM YOU IS BAD NEWS FOR US

Response to the first two editions of Northrop NEWS' new family of publications has been both encouraging and helpful.

Because Northrop people work in scattered locations, special arrangements have been made for NEWS coverage.

For the convenience of employees, two editorial offices are maintained: at Corporate headquarters in Beverly Hills and at Hawthorne.

During the absence of Editor Charles Bradford, Chuck Ramsey is acting editor, working out of the Corporate office. He is assisted by Rosemary Hussey.

The Hawthorne office is in the Norair Industrial Relations area, second floor, with Bryan "Wick" Weickersheimer in charge. The telephone extensions are 2456 and 2457.

NEWS staff members visit each Northrop facility on a weekly, and sometimes daily, basis. Calls may be made to either office at any time to arrange appointments at outlying points.

Through the cooperation of both Public Relations and Industrial Relations, NEWS contacts have been established at all West Coast Northrop facilities. Suggestions and ideas for stories may be forwarded to any of the following:

Northrop Space Laboratories, Nils Johnson ..... ext. 2743
Nortronics (Palos Verdes), George Richards ..... ext. 441
Or Public Relations ..... ext. 236
Nortronics (Hawthorne), Harry Clark ..... ext. 301
Nortronics (Anaheim), Elmer Noonan ..... ext. 283
Northrop Ventura, Hank Still ..... ext. 343

Request for special photographic coverage should be made through either of the NEWS offices or the men listed above.

Instructions for filing classified advertisements are carried on page 5 of each edition of the NEWS. Classified forms are available through Industrial Supplies stores at each Northrop location.

Northrop Recreation Club commissioners receive special forms prior to each publication date as reminders to submit news items. Arrangements to receive such forms may be made through NEWS offices.

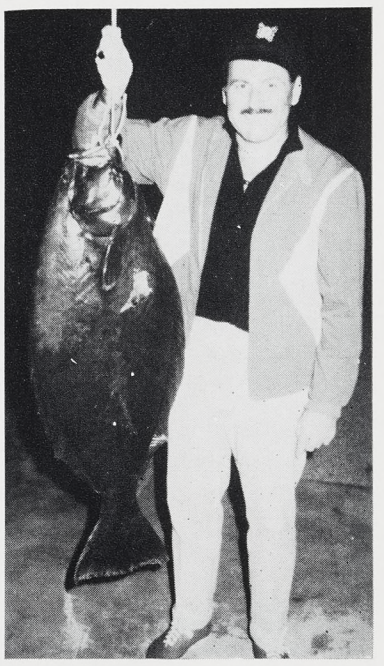
WILL MACHINES EVER REPLACE SECRETARIES?

The National Secretaries Association, Airborne Chapter, announces that a symposium entitled "The Automated Secretary" will be held in conjunction with UCLA University Extension on April 3.

The symposium, open to all secretaries, will discuss such issues as the effect of automation on the secretary's job and the promise of new leisure and cultural opportunities through automation.

Also many important glimpses into the near future will be previewed.

For information contact Marianne Weltman, ext. 1496; Marge Stevens, ext. 2358; Mayme Colombo, ext. 721.



FILETS UNLIMITED—Bob Bowditch of Ventura Division shows off 51-pound halibut.

PLANS FOR PROGRESS

Northrop Industrial Relations directors pledged continued support of equal opportunity employment when they hosted a special conference in Beverly Hills to discuss furtherance of the program. Hosts and special guests included (left to right): Northrop Vice President-Industrial Relations William Larrabee; Don M. Thomas and P. B. Lewis of Plans for Progress staff, Washington, D.C.; Elmer Noonan, Nortronics director of Industrial Relations; and Howard Lockwood, Lockheed Aircraft Corporation.

SPEAKING OF STATUS, HOW ABOUT THAT F-5B

If airplanes were capable of being status conscious, there is one F-5B operated by Norair Division which probably would insist that its hangar be built in Bel-Air. Since coming off the Norair production line last July, the craft has flown hundreds of VIP's, including members of royalty, U.S. and Foreign military officials, and this month the Northrop fighter went through its paces with an Air Force chaplain as copilot.

This week the demonstration plane took off with passenger number 500, it was reported by George Sterling, coordinator of the flights.

As for snootiness, the F-5B hasn't turned up its nose (except in its phenomenal rate of climb) at sod fields and other unusual facilities which it has had to use in order to show its capabilities.

Leased from the Air Force for use by Customer Relations, the demonstrator has logged more than 300,000 miles in its 500 flights, which have ranged over most of the free world.

The craft has been flown by as many as seven Norair pilots, but John Fritz comes the closest to qualifying for equal status with the plane as anyone.

Among the elite passengers to date have been the Shah of Iran, General Curtis LeMay, Norwegian Minister of Defense, General Jacob E. Smart of CINCEUR and General Mohammad Khatami, commander of the Imperial Iranian Air Force.

Plans are presently being made for a three week tour of U.S. military installations in the Pacific next month. The demonstrator will operate out of Hickam AFB, Hawaii, Mr. Sterling said.

Starting the second 500 passengers will be both Air Force and Navy officers stationed in the Pacific, as well as officers of the Royal Australian and New Zealand military.

Actually, the demonstrator's permanent hangar is at Edward's Air Force Base, near Palmdale but it doesn't seem to mind the heat and sand.

John Kerr and radome.

RADOME

(Continued from Page 1)

ses a characteristic of very low loss of electromagnetic waves. But since a solid ceramic radome would be far too heavy for existing missiles, the maximum use of lightweight plastics was studied by the group.

"The Ventura radome is designed for a whole family of missiles," Mr. Kerr said.

The Ventura design incorporates many different kinds of ceramic and plastic materials, and the Division now is developing its capabilities in ceramics to support its burgeoning radome business. The Division has for some time been building its capabilities in thermo-setting plastics.

Sclerosis Society Elects Executives

The National Multiple Sclerosis Society, Southern California Chapter, has elected two Northrop executives from the Beverly Hills offices to its 1965 Board of Trustees.

They are John R. Alison, Corporate vice president, Customer Relations, and Gwynn Robinson, director of Marketing for Northrop International.

ECHO

(Continued from Page 1)

lished that the orbiting Echo satellite could have been tracked from any location in the western United States without any programming changes.

Accuracy of the mission was supported by orbital data independently collected by Smithsonian Astrophysical Observatory.

Similar optical tracking techniques are being employed by Northrop Nortronics in the design of an airborne photographic system currently under development for the Air Force.

Designed to solve the problems associated with photography-inhibiting cloud cover, the high resolution camera system will fly at approximately 40,000 feet to film various stages of missile flight after launch.

Ambassadors Map October Travel Plans

Preliminary plans associated with group travel to Europe this fall have been revealed by the Ambassadors, an organization open to all Northrop Corporation employees.

Two grand tours are currently under consideration. Both would run from October 20 through November 27 with the traveler having an option of air travel only, or a combination of air travel and tour.

Round trip air fares would be $315 per person. Tour participation, which includes meals, European transportation and lodging, would be an additional $298 per person. A deposit of $100 is required upon date of registration. Another $100 is due on May 1, with the balance to be paid by August 1.

A Northern European vacation would include stops at such points as London, Amsterdam, Hamburg, Halden, Oslo, Stockholm, Copenhagen, Hanover, Luxembourg and Paris.

A Southern European tour would include stops at London, Brussels, Amsterdam, Koblenz, Ulm, Innsbruck, Verona, Florence, Rome Viareggio, Milan, Lucerne and Paris.

Further information is available through all Northrop Personnel Activities offices.

Continents, States Worked by Amateurs

Two operating achievements have been scored by the NRC Radio Club (Anaheim), Commissioner Paul Staudenmayer reports.

A WAC (Working All Continents) certificate has been received for contacting the six major continents of the world. A WAS (Working All States) certificate has also been received, Mr. Staudenmayer said.

Activities are centered at the club station, WA6YNT, located adjacent to the cafeteria. Operations are carried out daily during lunch periods and interested persons are invited to drop in, Mr. Staudenmayer said.

SAVING 'A MILLION FORTUNES' IS JUST ANOTHER SERVICE

Just another Northrop service?

Crew members at a Page Communications Engineers, Inc., station in the Western Caroline Islands think so.

When four of the crew spotted a Japanese ship in distress in Kombail Lagoon, they went out to see if they could help. A sick crewman had forced the ship to put into strange waters, and the captain had no seagoing charts of the area.

Pagemen called for Singeru Techur, station gardener at the Koror Pacific Scatter System site maintained by the Northrop subsidiary.

Mr. Techur piloted the ship to Malakal harbor 10 miles and two islands away.

The ship's name, "Man Ei Maru II," translates into English as "A Million Fortunes."

AT FUNERAL

'Family' Bids Sarah Swayze Adieu

When funeral services were held for Mrs. Sarah Swayze March 15, her only "family" in attendance was a large contingent of Nortronics employees and friends.

Mrs. Swayze was not a Northrop employee, but she was as much a part of the plant's everyday routine as anyone, and the affection and esteem held for her by Nortronics personnel was rare.

For more than a decade she had served Anaheim employees. She functioned best at her post in the patio snack bar, but she also worked for a time in the cafeteria and as supervisor of all Anaheim snack bars for W. T. Stewart Company.

Those who knew Mrs. Swayze liked her friendly greeting. They admired her ability to be alternately gruff and tender as the occasion warranted.

To say Mrs. Swayze was "well informed" of Nortronics happenings is an understatement. She served coffee and cake at more birthday and farewell parties than anyone cared to remember. She considered the needs of employees as her personal responsibility.

The little things, too, endeared her to many. Like her practice of opening the snack bar 45 minutes early (at 5:30 a.m.) so night shift employees could have fresh, hot coffee waiting for them.

Mrs. Swayze suffered a stroke while at work March 4. She died a week later.

Nortronics employees paid their last respects to Mrs. Swayze at Melrose Abbey in goodly numbers. It was a fitting tribute for she had no other relatives.

Virgil I. (Gus) Grissom, half of America's first two-man astronaut team, tries on personnel parachute harness specially tailored for him by technicians at Ventura Division.

CAPE

(Continued from Page 1)

Young to their Atlantic Ocean landing area.

While there were five parachutes in the Ventura system, only three were required for the landing. An 8.3-foot diameter drogue was deployed by mortar at about 50,000 feet altitude after the craft completed its three orbits and reentered the earth's atmosphere.

At 10,600 feet, an 18-foot diameter Ringsail pilot parachute opened to operate in tandem with the drogue. Two seconds after opening, the pilot parachute pulled the rendezvous canister—containing the astronauts—from the vehicle, and the main Ringsail, with a diameter of 84 feet, was released.

In addition to the eight specialists at the Cape from NSL and Nortronics, another dozen Northrop engineers were assigned to JPL facilities at Pasadena. Jack Howard of NSL is coordinator for all Northrop activities in the Ranger program.

No further Ranger missions are planned at the present time.

Nortronics Sponsors Golf Tournament

Nortronics Golf Club will sponsor a tournament at Fallbrook Golf and Country Club, near Oceanside, April 3. All Northrop employees are invited to participate, according to Commissioner Dick Teel.

Mr. Teel asks that golfers bring a copy of their handicap cards for the tournament chairman if they wish to compete. A bogey flight has been established as well.

Starting time is 8 a.m. Maps showing routes to the course are available in Industrial Relations offices at Nortronics' Hawthorne facility.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 4 | April 7, 1965

Jim Ricketts, Ray Schultz In New Jobs

James M. Ricketts has been named deputy manager of Operations for Nortronics Division.

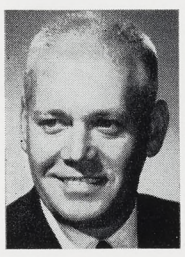
Mr. Ricketts, who was director of Manufacturing before being promoted to the new post, will be headquartered at Anaheim. He will report directly to Frank W. Lynch, Division vice president and manager of the Operations department.

Named to succeed Mr. Ricketts as director of Manufacturing was Raymond A. Schultz, formerly assistant director of the section. He will also be based at Anaheim.

Mr. Ricketts, who joined Northrop in 1951, has more than 20 years in industrial management experience, including service with the U.S. General Services Administration.

He recently received the annual "John J. Montgomery Project Award," presented by the National Society of Aerospace Professionals, for his contribution to the success of the Navy's Polaris missile program. The Nortronics Division provides the automatic test equipment which verifies missile system readiness aboard all fleet ballistic missile Polaris submarines.

Mr. Schultz, who was graduated from Manhattan College (New York) with a degree in industrial management and industrial relations, joined Northrop in 1962 after 12 years in the automotive industry.



Mr. Schultz

Mr. Ricketts

NORTRONICS MAN CLAIMS RECORD FOR COMMUTERS

Unless someone can top him now, Leo Grizel would like to claim an all-time commuter record of 196,000 miles.

Mr. Grizel of Nortronics (Palos Verdes) has driven the miles going to and from work at Northrop.

Between 1946 and mid-January of this year, Mr. Grizel lived in Burbank and commuted to Hawthorne. Earlier this year he transferred to the Division's Palos Verdes facility, adding about 30 miles to his daily round trip.

Mr. Grizel logged most of the miles in a 1947 model used car he bought in 1956, although he's used five other cars during the period.

Living Memorial Being Set Up for Adm. Bagdanovich

Rear Admiral Mike Bagdanovich (USN, retired), who died March 1, will not be forgotten. A living memorial, in the form of a day nursery for enlisted men's children, is being established in his name at the Long Beach Naval Shipyard.

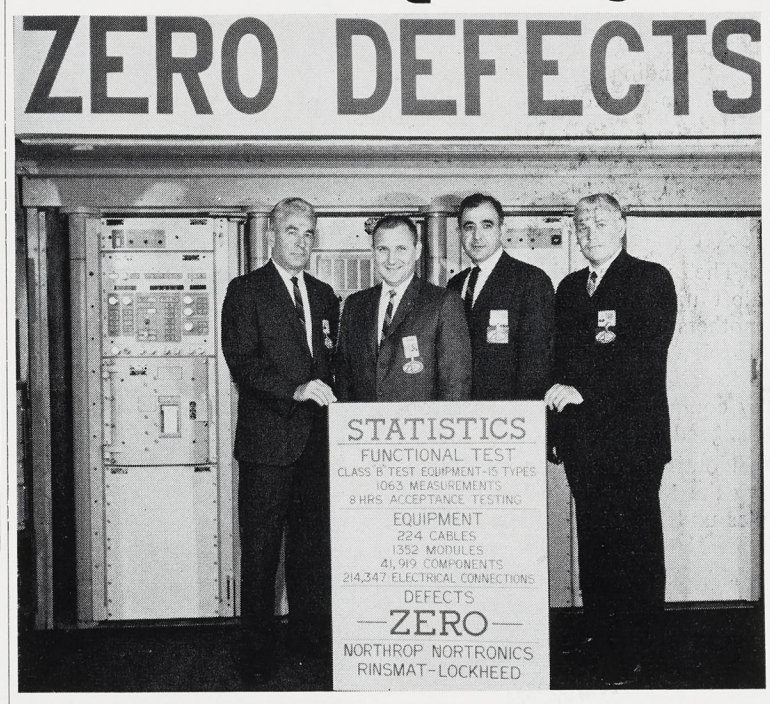
Admiral Bagdanovich served Nortronics Division for more than six years after his retirement from the Navy. He was in the Marketing department until last year when he became a consultant in ordnance and automatic systems to the Division.

As a Navy officer, he frequently devoted his thoughts to improving the career incentives offered young men by the Navy.

He felt that one of the most significant deterants to a young man considering a career was the thought of hardships that might be imposed on his family. It was his hope that financial strain could be alleviated for young

(See ADMIRAL, Page 6)

Defects Are Zero in New Mark VII Quality Program



RESULTS ARE OBVIOUS—Nortronics Division has applied Zero Defects concept practiced at Lockheed M&SC to its work on Mark VII Missile Test and Readiness Equipment shown behind group above. At formal introduction are, from left, Frank McNabb, Nortronics director of Quality Assurance; Dale Cornelius, director, Quality Assurance, RINSMAT; Ed Bress, Lockheed senior Product Assurance representative; and Ray Schultz, Nortronics director of Manufacturing. Group holds sign indicating magnitude of parts, tests involved in final acceptance.

A new concept is being applied to Nortronics Division's stringent quality control practices and from all indications the "measurements" continue outstanding in the Mark VII program.

Nortronics delivers Mark VII systems to Lockheed for integration into the Fleet Ballistic Missile Weapons System for the U.S. Navy Bureau of Weapons.

Carried aboard nuclear submarines of the 616 and 627 class, the Mark VII is utilized to perform functional tests on Polaris missiles. They include the continuous monitoring of critical missile circuits, readying of the missile for launch and determining the readiness of missile components.

The Mark VII system consists of six hinged doors mounted on posts in the missile control compartment aboard the submarine. On these doors are mounted 1352 modules, 41,919 components, and 224 cables all joined by 214,347 electrical connections.

Before each Mark VII is delivered, it goes through a tough and detailed factory acceptance test. This involves the taking of 1063 measurements utilizing 15 types of Class "B" test equipment and covering a full eight hours of test time.

Following completion of the latter recently, the Zero Defects application was formally introduced at Nortronics (Anaheim). Taking part were: Dale Cornelius, director, Quality Assurance department, RINSMAT; Ed Bress, senior Product Assurance resident representative for Lockheed; Ray Schultz, Nortronics director of Manufacturing; Frank McNabb, Nortronics director of Quality Assurance; and Don Bluckner.

'Fine Effort' on Space Flight Draws Industry Praise

Amid congratulations from NASA and McDonnell Aircraft Corporation, Northrop Ventura last week was analyzing the performance of its landing system during the Gemini flight March 23. Corporate Vice President and General Manager George F. Douglas announced this week that he had received a telegram from McDonnell — prime contractor to NASA for the Gemini capsule— which commended all Northrop Ventura personnel "for their fine effort directed to the Gemini Project."

"The cooperation, understanding and thoroughness displayed by Northrop Ventura personnel throughout the entire program has most certainly been appreciated by the McDonnell/Gemini team," the McDonnell statement said.

A transcript of comments after the flight by astronauts Virgil Grissom and John Young included these comments:

"As we came on down to 10,000 feet the main parachute came on out normally as we expected," Grissom said. "It came out in a reefed position and deployed in its full open position.

"There were no holes in it, no tears in it, it was a perfectly beautiful chute. A really beautiful thing."

"Sure was," Young agreed.

Program Manager Stan Gewant returned to his Ventura office to report numerous "unofficial" congratulations from NASA and McDonnell personnel assigned to Gemini, as well as representatives of Weber Aircraft Corporation, which awarded Northrop a contract for the Gemini ejection seat system."

RADIO CLUB

Nortronics (Hawthorne) Radio Club members gather at 8 p.m. April 20 at the Plant II cafeteria for a regular monthly business meeting.

Cagers Drop Game By Single Point

A disappointing one-point loss (46-45) to the Celtics dropped Nortronics (Anaheim) top basketball team out of a first-place tie on the eve of the completion of another season last week.

With only one game remaining on the schedule, the NRC entry had little chance of regaining the top rung in the Anaheim Open league.

In the Celtic game, the Nortronics roundballers held a 10-point lead for most of three quarters and then fell under the steady shooting of their opponents.

Despite the loss, the NRC team was elated over a good season. Commissioner Don Ross reported top support from such team members as John Rettberg, Bill Berger, Steve Kauffman, Jon Klotz, Bob Lawther, Jack Larsen and Jim Stone.

More Sports, club news on Page 6

BY HUGH CLARY

Mariner Flight Set to Music

There is more to launching a spacecraft than engineering and hardware.

And Hugh Clary is just the man to prove it.

For everyone in the launch crew knows that a little song he sings played an important part in the successful launch of Mariner IV.

As a Northrop Space Laboratories documentation engineer assigned to the Ranger and Mariner projects at Jet Propulsion Laboratory in Pasadena, Hugh wrote another chapter of aerospace legend with the song that begins:

"Good morning, good morning,

Another day is dawning. . ."

In those days the song meant a great deal to the System Test and Operations group.

Mariner IV lifted off at Cape Kennedy November 28 atop an Atlas-Agena D vehicle. It is scheduled to pass within 5400 miles of Mars in mid-July after a 228-day cruise of 325 million miles. In addition to transmitting data on deep space environment, Mariner is expected to send back pictures of the Martian surface and information on the planet's atmosphere.

Hugh Clary's memories of Mariner, however, cover the five-month period prior to launch. As a member of the test direction team, he followed the package of intricate system from final assembly to launch.

Complete tests of Mariner took anywhere from 18 to 30 hours, Mr. Clary recalls, and on many occasions the launch team's morale at 2 a.m. was lower than the Mohole project.

It was in the wee hours of such a day that Hugh looked up from his test procedure and remembered a disc jockey's early morning program which featured a bright, simple good morning song. He began to sing.

For the next two months, Hugh started each day with his good morning song. The group was registering success after success in their race toward a November 27 launch.

At 3 a.m. on the 27th, the countdown began for takeoff. Launch was scheduled for 10

(See CLARY, Page 6)

M-2 Research Glider Out of Assembly Jig

LIFTING BODY VEHICLE SET FOR JUNE DELIVERY

Northrop Norair has removed the M-2 lifting body research glider from its assembly jig. Delivery is slated for early June. Immediately after removal of the M-2, modifications to the jig were started for fabrication of the HL-10. Norair is building both vehicles for NASA.

With the exception of the lightweight plywood model which was flown successfully at NASA Flight Research Center, they are among the nation's first manned lifting body vehicles and will be used in an extensive test program to further the art of returning manned vehicles from space.

Present schedules call for the M-2 to go to Ames Research Center for a 100-hour wind tunnel test program. Subsequent flight testing will be performed at Edwards AFB.

Most systems utilized are "off-the-shelf" type items already in use on aircraft. For instance, the main landing gear is from the Northrop F-5A with main wheels and brakes from the Northrop T-38.

Design provisions have been made for ultimate installation of rocket engines.

The vehicle will be carried aloft under the wing of a B-52 mothership, as with the X-15 research vehicle. In fact, the X-15 pylon is used for either vehicle by equipping it with a Northrop-designed adapter.

Norair is designing and building the M-2 and the HL-10 vehicles under a $1.8 million contract with NASA.

NASA's Ames, Langley and Flight Research Centers are cooperating in the project for the NASA Office of Advanced Research and Technology.

Paul Bikle is director of the Flight RC; John G. McTigue serves as M-2/HL-10 program manager for NASA.

Heading Norair administration of the effort are Dr. L. R. Fowell, manager; Ralph C. Hakes, director, and Chiefs L. W. Klauer (Engineering) and Rex Thornhill (Construction).

Other key Norair project figures are: T. J. White, Quality Control; C. H. Hiller, Fabrication and Assembly; Clifford Peterson, Materiel; J. E. Wolfe, Structural Design; F. R. Erb, Systems and Mechanical Design; R. C. Pontious, Test Operations; and Ray Horton, Tooling.

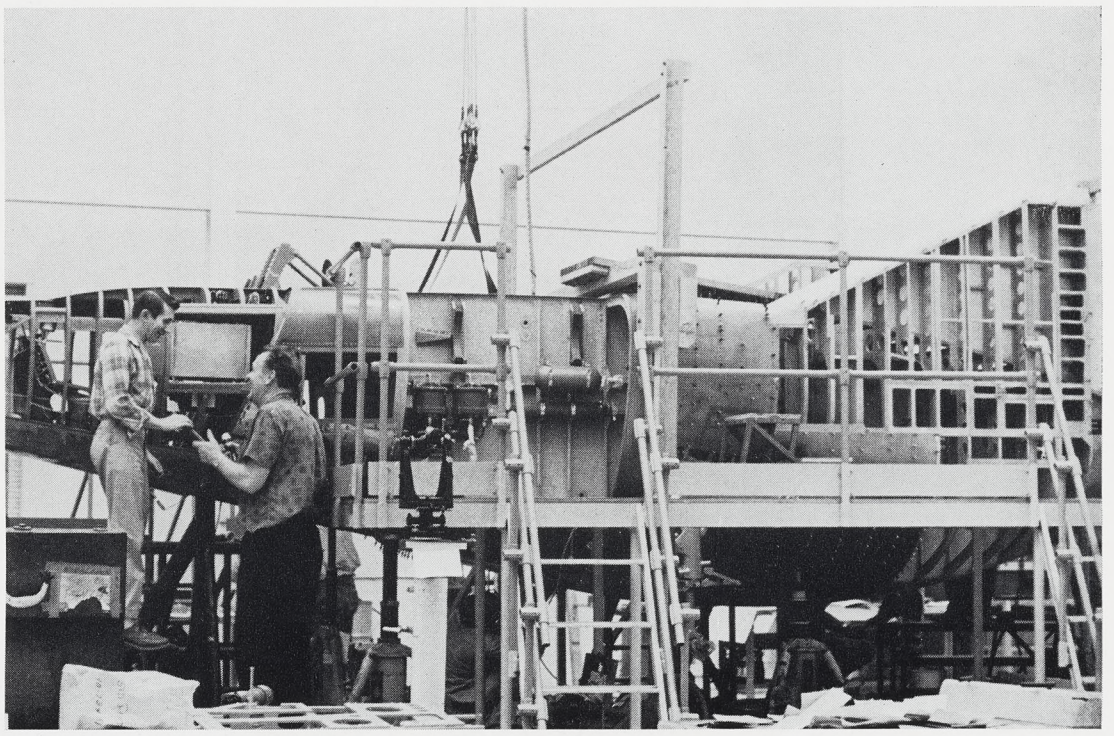
Filling out the project staff are about 125 high-quality engineers and factory employees with extensive aerospace experience. In fact, the experience average per man is about 20 years.

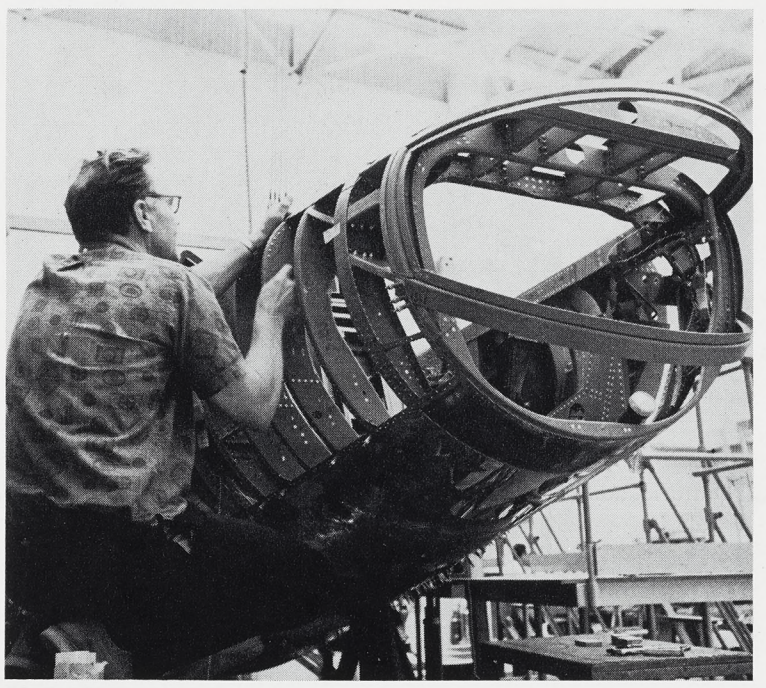
This combined project organization, through outstanding personal and team efforts, is making it possible for Norair to adhere

(See GLIDER, Page 3)

TOOLS OF TRADE

Robert D. Martinas (above) prepares fasteners for M-2 fabricators, while designers (below) check drawings. Ralph C. Hakes, Norair project director; John G. McTigue, NASA program manager; and L. R. Fowell, manager of Program department (left to right) this month praised smooth operation of project to date.

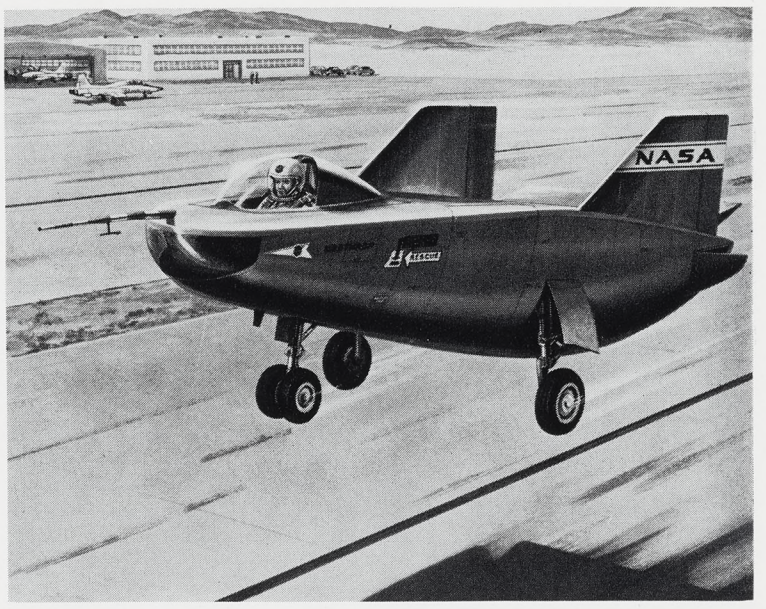


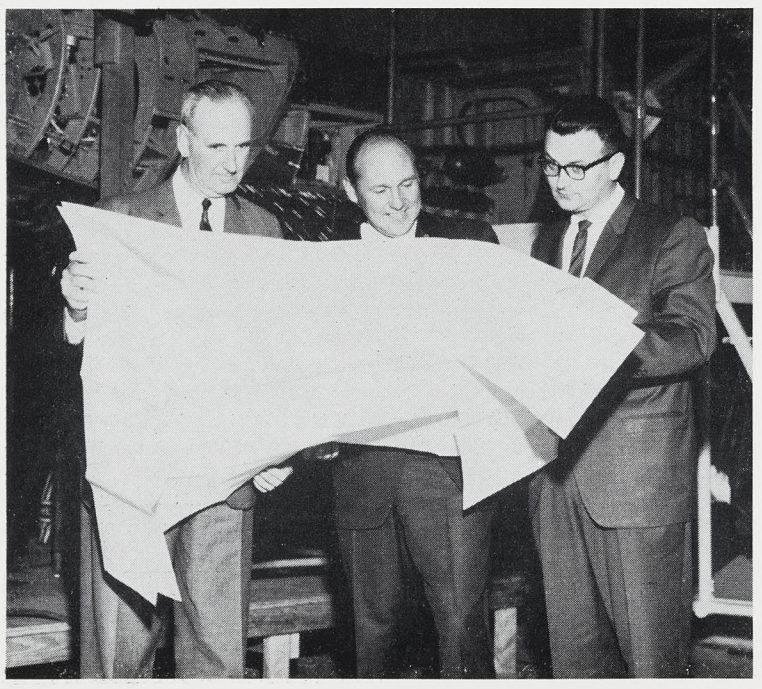


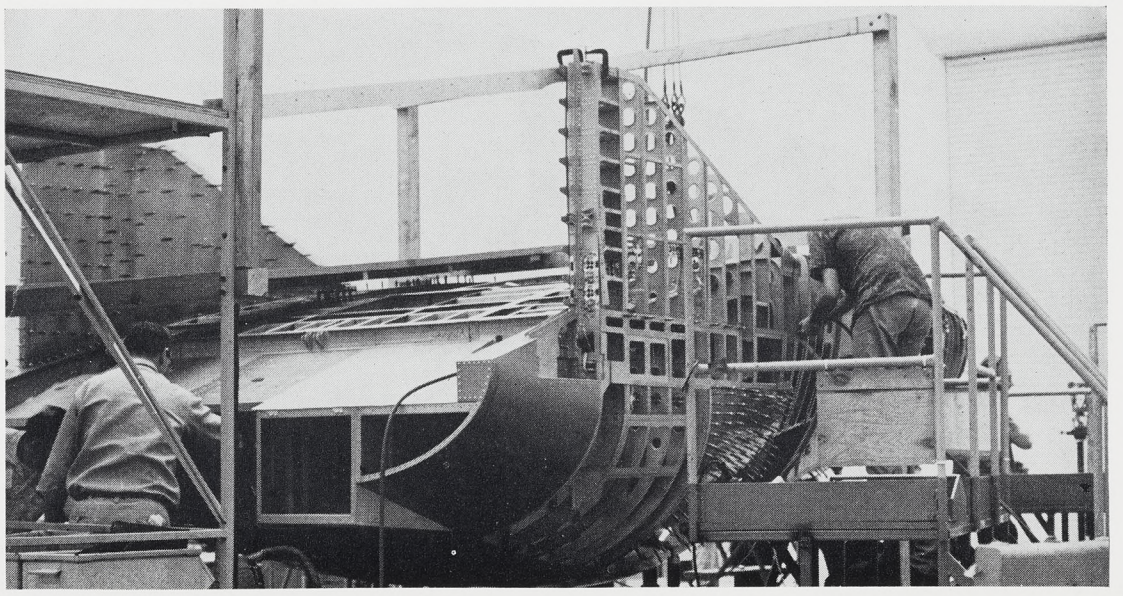
SHAPING UP

Four views of M-2 mark progress and hopes for complete success. Jack Fisher and Marvin Elkin (above) liven up full length shot; Mr. Elkin (left) works on front end; artists conception (below) shows M-2 gliding to landing; rear of vehicle (bottom of page) is being designed for possible inclusion of engine.

Photos by BILL COX and DAVE SALDANA







SMITH, RICHARDSON SELECTED FOR NEW IR ASSIGNMENTS

Appointment of Frank R. Smith to fill a new position as Northrop Corporate director of Industrial Relations has been announced by William Larrabee, Corporate vice president—Industrial Relations.

Mr. Smith moves to his new assignment from Northrop Space Laboratories where he has served as director of Industrial Relations and is being succeeded by John J. Richardson, formerly of Nortronics Division.

Holder of a law degree from the Loyola University School of Law (1955), Mr. Smith received a B.A. degree in Business Administration (1947) from UCLA and graduated (in 1944) from the University of Michigan Japanese Language School.

Mr. Smith joined Northrop at Norair Division in 1956 as chief of Employee Relations and worked previously at Douglas Santa Monica as staff assistant to the director of Industrial Relations.

Mr. Richardson's Northrop experience dates back to 1951 and includes work as Employment supervisor, general supervisor of Personnel Administration and chief of Industrial Relations at Nortronics' Systems Support department. He has been chief of Personnel Administration for Nortronics for the past year.

Mr. Richardson studied Industrial Relations and Industrial Management at the University of Southern California prior to joining Northrop.

Mr. Richardson

Mr. Smith

PALMDALE FAMILY AFFAIR — Father-son teams currently working at Norair (Palmdale) have logged over 100 years of combined Northrop service. Three of sons were born after their father began Northrop service. Men, from left with father's name first, are William C. and Dennis Wible, George M. and Charles D. King, Herman J. and Fred J. Burns, David G. and David G. (III) Hogarth, and Ray A. and Donald E. Bevans.

(Norair Division photo)

NORTHROP LOOKS AHEAD

Anticipating Events to Come

What are the probable consequences of the population growth in the United States? In other countries?

Which of the new nations of Africa are really going to make any industrial progress in the next decade?

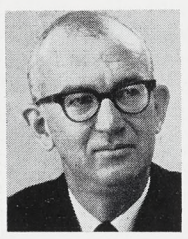
What is the state of Mao Tse-Tung's health . . . and who is likely to be his successor?

In ten years, it is said, computers will be able to store all the information in the Library of Congress and deliver any data in 10 seconds. How will this kind of capability affect the business environment?

Questions such as these are of vital concern to Ward B. Dennis, Corporate vice president - Forward Planning. Mr. Dennis' job is to see these events and to understand the opportunities . . . and dangers . . . they may hold for Northrop.

A good example is the recent explosion of a nuclear bomb by Red China. "With this development," says Mr. Dennis, "the Chinese have taken a major step toward the possibility for waging a sophisticated war. What course will they pursue and what will be the future impact on United States defense posture?

Because of Northrop's diversity, there's no narrow boundary on its future business prospects. As a result, Mr. Dennis must keep his fingers on many a pulse. "The purpose," says Mr. Dennis, "is to plan in anticipation of events to come, not to react to events that have already occurred."



Mr. Dennis

Mr. Dennis keeps a watchful eye on opportunities in such things as the Great Society, rapid population growth, the shifting policy of the Soviet government, the impact of the supersonic transport of our economy, and the country's future needs in transportation and in development of water resources.

Marketing organizations in Northrop are continually investigating the opportunities for Northrop that Government planning may hold. But Forward Planning is looking for the important consequences of new developments in the technical, political, economic, social and military areas which could affect the future course of company business.

(See DENNIS, Page 5)

Papers Call Sounded By Shock Symposium

A call for papers for the 35th Shock and Vibration Symposium to be held October 26-28 at New Orleans, Louisiana, has been issued.

The program will be devoted to technical presentations and discussions which tend to advance the shock and vibration technology. NASA will be the host.

Summary information on potential papers must be submitted by July 13, with final papers due October 11. Information should be forwarded to: Shock and Vibration Center, Code 4021, U.S. Naval Research Laboratory, Washington, D.C. 20390.

Steven Kyser Wins Top Essay Laurels

Steven Kyser, a member of Norair-sponsored Explorer Scout Post 173, has earned the right to enter a national contest on the strength of his recent accomplishments.

Steven, a Morningside High School senior, took first place in a local contest for his essay on "How the Handicapped are Overcoming Barriers to Employment in My Community." He will deliver the same essay in a national contest at Washington, D.C.

Presentation of honors was during the Centinela Valley "Ability Counts" Awards luncheon held March 12 at the Airport Marina Hotel.

Sponsoring the event were the President's Committee, the Governor's Committee and the Centinela Valley Committee on Employment of the Handicapped.

John B. Clark, retired Norair director of Industrial Relations, presented the awards. Roland B. Scott, executive assistant to Paul Crews, Norair's director of Industrial Relations, is currently a member of both the Governor's and Centinela Valley Committees.

Glider: Unique Organization Cuts Cost, Speeds Activity

(Continued from Page 2)

to the tightest possible funding on the project.

Toward this end, Norair has made some special arrangements.

The project organization is segregated from other Norair operations to minimize interference and factory areas are co-located with engineering for ease of communication.

Engineering releases and most paperwork have been chopped to the barest minimum. Incoming materials and stocks are located adjacent to the assembly jig. Engineering liaison is accomplished by the design engineers.

Experienced experimental shop technicians are fabricating and assembling components from a bare minimum of formal drawings, and in some cases, from verbal instructions. Few detailed drawings have been made. A special photographic process has been perfected to transpose drawings onto actual raw stock, avoiding costly jigs and fixtures.

A paramount factor has been cooperation, within Norair functions and especially between Norair and the NASA organizations involved.

"In my 37 years of experience I have never encountered such close harmony on a project," Mr. Hakes said. "We are deeply indebted to NASA for its valuable and timely help every step of the way."

Mr. McTigue added a word of praise for the very special efforts of Norair individuals and the entire project organization for its team showings.

"We have encountered problems, met them head on and worked out solutions jointly," Mr. McTigue added. "This program will go down as an excellent example of what close cooperation between many organizations can accomplish."

Sea World Visit Set for April 24

The combined NRC Travel Club, open to all Northrop employees, has slated a special one-day trip to visit San Diego's new Sea World.

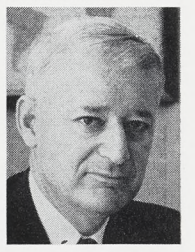
The date is April 24. One Greyhound bus (capacity: 29 passengers) will depart the NRC Clubhouse at Hawthorne at 11:30 a.m. going direct to Sea World. At 5 p.m. arrangements will be made for dinner at the Vacation Village.

Round trip bus fare is $5.50 per person. Admission (to Northrop folk) at Sea World is $1.75. Steak dinners will be an additional $3.95 per person.

Tickets are now available through Personnel Activities offices at each Northrop facility.

MORRIS PLOTKIN NAMED CORPORATE PLANS DIRECTOR

Morris Plotkin has been named Northrop Corporate director—Industrial Planning, reporting to Robert R. Miller, senior vice president—Corporate Relations.



Mr. Plotkin

Under Mr. Miller's guidance, Mr. Plotkin will have responsibility for the planning, coordination and direction of investigations relating to diversification possibilities for Northrop through potential acquisition of other companies or segments of companies, formation of joint ventures, and the acquisition of new products or technologies.

Mr. Plotkin joined Northrop in 1956 as assistant director of Facilities Planning and has been on the Corporate Development Planning staff since May 1957. Prior to 1956 he was with Slick Airways, Inc. and Civil Aeronautics Administration in executive capacities.

Mr. Plotkin holds B.A. and M.A. degrees from UCLA in Political Science.

NORAIR COLLECTION ESTABLISHED TO AID EYES FOR THE NEEDY

Northrop Norair employees and friends are being asked to lend a special hand to New Eyes for the Needy, Inc.

This nonprofit, charitable organization makes eyeglasses available to needy persons unable to procure them otherwise. Since 1932 it has served this purpose and has never solicited funds.

Sought are metal frames in any condition, unbroken plastic frames, sunglasses, artificial eyes, cataract lenses, and soft glass cases.

Also useable are broken costume jewelry pieces, earrings without mates, damaged silver or other precious metals. These are refined and money obtained used to provide funds to hospitals across the nation to buy glasses.

Collection boxes have been set up in Norair's Personnel Activities office.

NORTHROP NEWS

Vol. 23 No. 4

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

NRC, ICE CAPADES MARK SILVER ANNIVERSARIES

An all-Northrop "Night at the Ice Capades" has been set for May 5 at the Los Angeles Sports Arena.

Because both the Ice Capades and Northrop Recreation Club are observing "Silver Anniversaries" this year, very special arrangements have been made.

Choice loge seats, 1000 of them, have been reserved for Northrop folk and are now on sale at west coast facilities at a bargain rate ($2.50 for regular $3.50 seats). And this is the opening night of Ice Capades 12-day run in Los Angeles.

While they last, tickets may be obtained from all Personnel Activities offices throughout Northrop; from Kay Cribbs at the Corporate office; Kelly Burke at Edwards AFB; Tom Post at Palmdale; Polly Middleton at Mariposa Warehouse; and the Personnel office at both Northrop Space Laboratories and Northrop Architectural Systems. Ventura Division tickets are available at the cafeteria.

Men, Moon, and a Morning Ride Through Space

GEWANT MIRRORS GEMINI PROGRESS

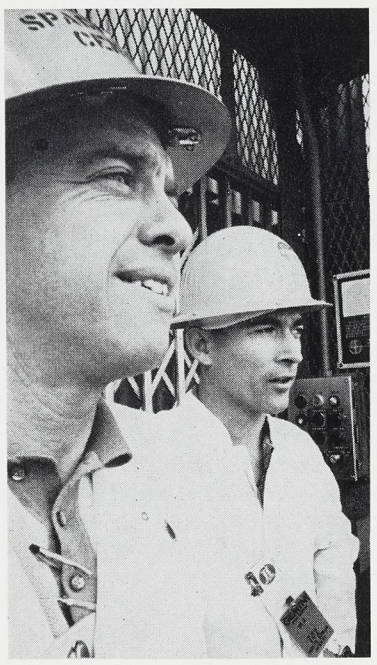
Progress of the Gemini orbital flight is mirrored in the expressions of Stan Gewant, program manager for the Northrop Ventura landing system.

What? A leak?

Re-entry in 10 seconds

They've got a drogue!

They're on the carrier!



Alan B. Shepard Jr. (left), pilot of Mercury Redstone 3 in 1961, has last minute words for John W. Young before launch of Gemini 3. Northrop Ventura landing systems returned Mercury spacecrafts to earth as well as Gemini 3.

Molly Brown Parachute "Beautiful"

A Northrop News Special

"Perfectly beautiful!"

These two words summed up the feelings of Astronauts Virgil I. (Gus) Grissom and John W. Young when their 84-foot orange and white main landing parachute blossomed above the Molly Brown on March 23.

Although the landing of Gemini Three was out of sight—far to the east in the Atlantic Ocean—the parachute was equally beautiful to Northrop Ventura personnel who waited tensely at Cape Kennedy, Florida and scores of others who helped fabricate the system at Newbury Park, California.

There was no doubt in the minds of technicians and engineers that the landing system would do its job. It had been tested scores of times under exacting conditions. But there was still a mental sigh of relief when word came that America's first two-man astronaut team had landed safely.

The flight of the Molly Brown itself was a culmination and a beginning. It brought to successful conclusion years of work which involved more than 1000 U.S. industries and 400,000 people under the direction of the National Aeronautics and Space Administration. It began a series of flights which will test men in long term weightless orbital flight and train them in rendezvous techniques essential to Apollo lunar flights late in this decade.

Tuesday, day of the flight, dawned clear and warm with a soft tropic breeze blowing in from the ocean. To the north of Cocoa Beach, a white glow in the sky marked the ring of searchlights around the base of the huge Titan II rocket booster where technicians made final preparations to load Grissom and Young aboard their spacecraft.

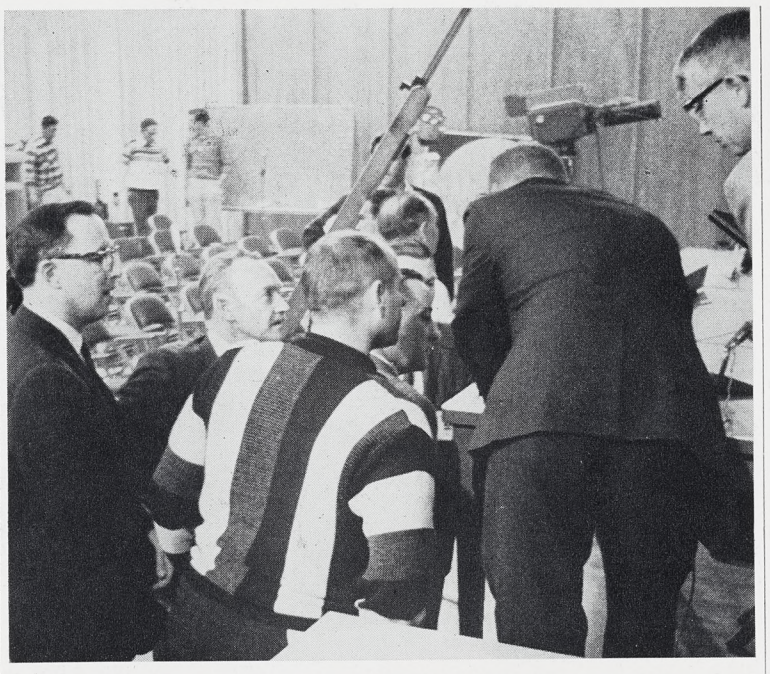
A chosen "pool" of newsmen and photographers were taken to the launch pad to witness and report on the astronauts as they ate breakfast, suited up and then were driven from their cloistered apartment on the base to the Gemini Titan launch Pad 19. As they were strapped into their seats aboard the spacecraft, both Grissom and Young appeared as unruffled as if they were going for a morning hop in a T-38 trainer.

An hour before launch time, the count was ahead of schedule, but then, about T-minus-40 minutes, a leak was discovered in a hydraulic line aboard the Titan booster. In earlier days, when spaceflight was a more experimental infant, this could have caused a mission "scrub" and a delay of two or more days in the flight. But this time a technician crawled into the booster, tightened a nut with a wrench, and the count was resumed.

At T-35 minutes, the huge gantry of steel girders topped by a white room laboratory, was lowered away. The white and black Titan booster towered clear above the scrub brush and palmetto of the flat Cape land, the Gemini spacecraft appearing as a small cone on its tip.

Without a flaw, the countdown continued until 9:24 a.m., T-minus-zero, a cloud of orange red smoke boiled from the base of the giant rocket. Moments later, it lifted majestically from the pad,

(See GEMINI, Page 5)



Northrop engineers assigned to Ranger IX program crowd around podium at Von Karman auditorium (above) to get official results of photographic mission. Control room at Cape Kennedy during Gemini flight (below) waits word from spacecraft that landing system is functioning normally.

Moon Drama Cheered by A.M. Viewers

A Northrop News Special

It was reminiscent of a Saturday afternoon at the movies 20 years ago, when a youthful audience inhaled and exhaled according to the perils and successes of Hopalong Cassidy or The Cisco Kid.

There were gasps; there were cheers; there was applause; there were moments of silence when everyone leaned forward as if expecting a badman to leap from behind a rock.

The audience ranged in age from teenagers to septogenarians, both men and women. But they all became children of the universe as a drama unfolded on a battery of screens in the semi-darkened room.

They were among the first people on earth to see live television pictures from space. They were moving 5977 miles per hour toward the moon in the Ranger IX. They were struggling to gain perspective as three huge craters disappeared into one; as a boney ridge in the crater Alphonsus suddenly dominated the screen.

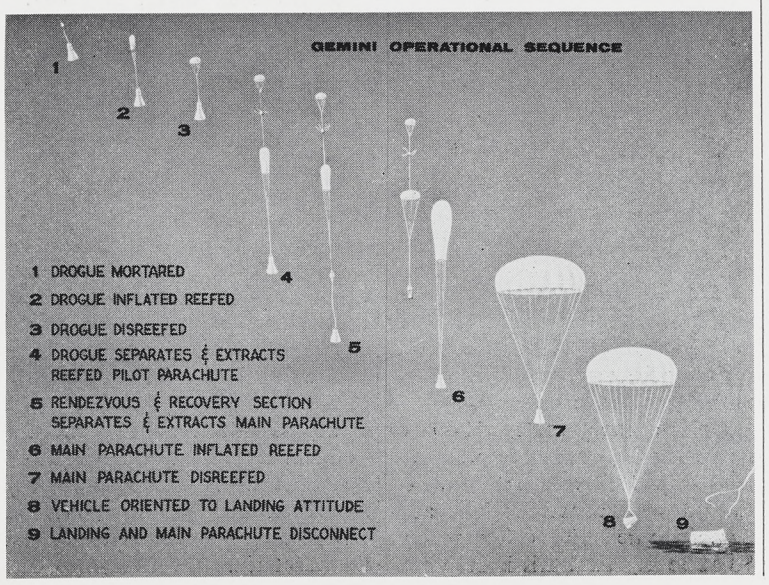
As more craters appeared below the ridge it looked as if Ranger IX had suddenly reversed itself and climbed back to an altitude of 1500 miles, but actually the audience was seeing tiny craters on the floor of Alphonsus.

When Ranger IX impacted at 6:08 a.m. March 24, the group of Jet Propulsion Laboratory employees, the press, and select visitors rocked the assembly room at JPL's Von Karman auditorium with their applause.

NSL's Bob Winneberger, who had full responsibility for trajectory design on the last three Rangers, jumped up with a big grin on his face (despite the lack of sleep for the past three days) and sought out other Northrop employees in the room.

He found Chuck Lombardo, who had just returned the night before from Cape Kennedy, and congratulated him on the excellent pictures returned by Ranger. Chuck was cognizant engineer for the TV payload and followed the system from inception at Pasadena to launch at the Cape.

(See RANGER, Page 5)



Cheering crowd relaxes after 19 tense minutes of watching moon through eyes of Ranger IX.

GEMINI: Never a Longer Wait for Contractors

(Continued from Page 4)

slowly at first, trailing a dancing, transparent rosy glow of flame.

For many, the waiting was over. The people who built the booster could go home now (although none did) because the booster had done its job. But nearly five hours of sweat remained, the time to complete three orbits, for those responsible for the welfare of the astronauts —all the way home.

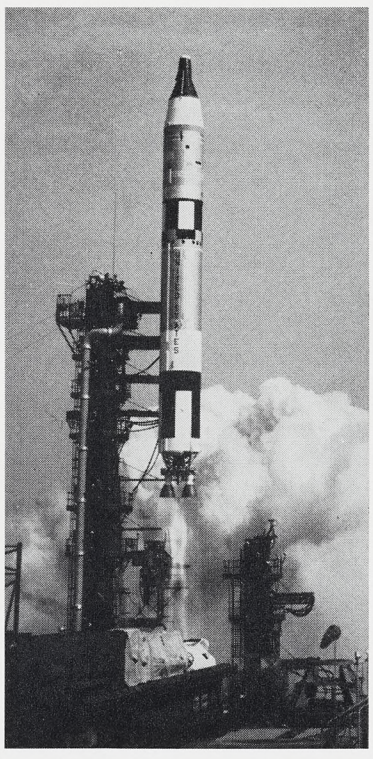
At the press site from Northrop Ventura were H. E. Riggins, vice president of Administration; Stan Gewant, Gemini project manager and Bert Engstrom, Gemini project engineer who had seen the landing system move from its inception to its acid test in manned flight.

Hours passed slowly in the hot sun with only occasional reports to indicate progress of the astronauts. At one point there was a rumor that trouble aboard the Gemini spacecraft would terminate the flight at one orbit, but this trouble passed and the flight continued.

Finally the third orbit neared its end. The retro-rockets fired, and the communications blackout began, the critical period during which the sheath of hot re-entry gases around the spacecraft cut off radio voice contact.

Seconds passed. It was time now for Grissom to release the switch which would deploy his 8.3-foot drogue stabilization parachute at 50,000 feet.

"They have a drogue", the voice of NASA's Paul Haney in Gemini Control announced calmly. "Molly Brown notifies that the drogue is out."



Titan II does its share.

The sigh of relief was a real one then. That announcement meant that the astronauts were capable of operating the system, and that it worked. There were no more announcements until word came that a plane had spotted the Molly Brown, floating on the ocean nearly 60 miles from the recovery carrier.

Grissom and Young were home.

DENNIS: Looking Ahead

(Continued from Page 3)

"Forward Planning's role is to understand the impact of such events as a guide for investigating potential opportunities in detail," explains Mr. Dennis.

Forward Planning begins with some very fundamental thinking about what kind of company Northrop is, and where it wants to go. This is not a one-shot decision, but rather a continuing analysis. Out of the analysis comes recommendations to the company's president, who sets long-term objectives and specific goals.

These objectives are not put under lock and key for a ten-year period. A long-term objective, points out Mr. Dennis, "is used to guide our current decisions and actions, and is continuously reviewed and tested for soundness in view of our changing environment."

Forward Planning seeks to define levels of activity in various business areas and the long-term investment and return to be realized from these areas. In essence, he frames an answer to the question: How much can we do and when?

Once the company's long-term objectives and specific goals have been set by the company's president, detailed plans are prepared for reaching these goals.

RANGER: Dawn Brings Success

(Continued from Page 4)

"The camera system was basically the same on Ranger IX," he said, "but the performance was much better."

Jack Howard, coordinator of all Northrop participation in the program, and John Schindler, program engineer, were chatting by a mockup of the Ranger IX, when JPL Program Engineer Ross Fink came up to shake hands.

Still at the Cape were Ed Travers, Mike Carolin, Mike Kelley, Herman Ayers, John Iwatsuru. Among those Nortronics and NSL men who decided to watch the show from their homes were Phil Billington, Tom Laney, Ken Lapardy, Joe Miller, Bob Kennedy, Keith Emberson, Art Cohee, and Frank Baran.

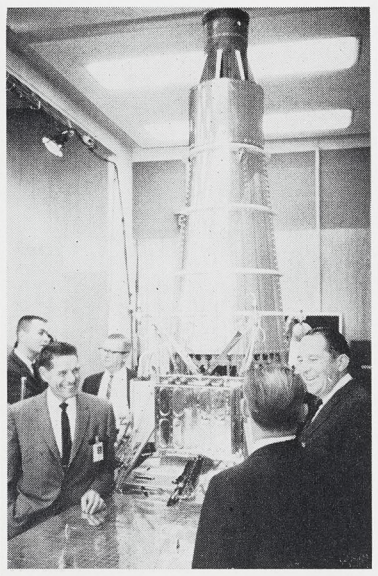
Key Nortronics men for systems used by Ranger had long since taken other assignments. Gordon Click was project engineer at Palos Verdes, assisted by Fred Corey and Don Domike. Lead engineers were Don Bull (electronic modules), Bob Kernor (celestial sensors), Laird McIntosh (inertial sensors), and Wilf Cowell (gas systems).

A small group of Northrop engineers will remain at JPL through the flight analysis stage.

JPL is now looking ahead to the first surveyor flight, which involves a soft landing on the lunar surface, it was announced at a press conference following the Ranger impact.

After the excitement was over in Von Karman auditorium, the Northrop team walked out into the new dawn just as JPL employees were rushing to their jobs.

NSL's Alan Kidd, who worked on the JPL program director's staff, came up with the capper to the three days when he said: "It's time to go to work."



JPL Program Engineer Ross Fink (left) chats with Northrop's John Schindler (far right) and Jack Howard beside mockup of Ranger 9 in Von Karman auditorium.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Refrigerator, Coldspot, $75. Hawthorne, OS 5-1057. A

Desert-Aire lamp, new coil, $35. Pacoima, 882-0761. A

Movie Camera, Holiday 8mm. turret, & projector & screen, $85. Inglewood, OS 5-7050.

Stove, apt.-size, $45. Inglewood, 677-4540.

Refrigerator, Servel, gas, 8 cu. ft. w/top freezer, $20. Gardena, 675-1005. A

Volvo, 1963, model 544, low mileage, all extras, $1775. Hawthorne, OS 5-1708. A

Power Mower, reel-type, $20. Lomita, DA 6-6214. A

Valiant V200, station wagon, 1961, auto. trans., p/s, r/h, new tires & brakes, $895. Inglewood, PL 5-4497. A

Corvair Monza Cpe., 1961, 3-spd. stick, r/h, w/w, $850. Thousand Oaks, 498-2867. A

Enlarger, solar photo, 35mm to 4" x 5" w/ lens, $30. Gardena, DA 9-2904. A

Freezer, Duncan Hinds chest-type, 18 cu. ft., $200. Redondo Bch., FR 4-7985. A

Boat, 14', trailer, new 25-hp Elgin eng., gas tank, cables & steering, $365. Hawthorne, OS 6-4923. A

Mobile Home, Roadcraft, 8 x 35' cabana, louvered windows, steel storage 8x8' rm., $4500. Gardena, 329-5879. A

Bedroom Set, 7-pc., solid walnut, mattress & spring, $150. Inglewood, OR 1-3860. A

Pontiac Tempest, 1964, 16,300 miles, 2-dr. sed., $2100. San Pedro, TE 3-9430. A

VW sedan, 1961, $900. Hawthorne, OS 6-1048.

House, 3-bdrm., 2-bath, heated pool, near Peninsula center, $38,500 or $300 mo. 1 yr. lease. P.V. Pen., 377-5936. A

House, 4-bdrm., stucco, plus 7 5-yr-old units, furn., near Northrop, 10% dn., $75,000. San Pedro, TE 3-2512. A

T-Bird, 1955, $1050. Hawthorne, 675-4555. A

Recliner Couch, chair, dryer, Hot Point elec., $200. San Pedro, TE 1-4906. A

Custom Drape sets, fully lined, silver grey, nubby loose weave, 11½ & 16 ft. long, $115. Thousand Oaks, 495-5949. A

Bicycle, 1965, girl's 26" Spaceliner, $49. Van Nuys, ST 4-2332. A

Swim Pool, 18' x 42', hy-duty vinyl impreg. nylon, skimmer, ladder, filter, $100. P.V. Pen., 377-4905. A

Golf Bag, green plaid, $3.50. Downey, 923-8532. A

Volkswagen station wagon, 1961, 10,000 miles, 1 owner, $1125. Redondo Bch., 376-6153. A

Hondo Dream 305, 1963, fully equipped, $450. Los Alamitos, 596-4215. A

For Sale

Sprite, 1959, customized, new tires, $700. Hawthorne, 631-6885. A

Dinette Set, Danish modern, white formica top, 6 chairs, $70. Walnut. 714-595-4959. A

Record player, Garrard model RC-90, 3-spd., hi-fi, w/magnetic cartridge, $25. L.A. 45, 645-4887. A

Model Airplanes w/McCoy engines, all hand controls, batteries, $25. Playa del Rey, EX 1-4860. A

Buick, 1957, fully powered, $295. L.A., 756-0068. A

House, 4-bdrm., family rm., 2-bath, ⅓ acre, pool, 3-yrs.-old, low dn., $37,900. Northridge, EM 3-1679. A

Falcon Ranchero, 1963, standard, r/h, w/w tires, $1200. Long Bch., 425-9532. A

Honda Trail 90, 1965, under 600 miles, $300. Gardena, DA 9-9046. A

Accordion, 120-bass, w/3 switches, case, $100. Manhattan Bch., 379-5366. A

Headboards, pr., twin, aqua leatherette covered, $10. Redondo Bch., FR 5-0061. A

Typewriter, L. C. Smith, elite, 15½" carriage, $25. Downey, TO 2-9547. A

Quartz Lamp, floor model, approx. 11" dia. w/timer & adj. stand, $50. Brea, JA 9-2369.

Studebaker Pickup, 1956, deluxe cab, 228 V-8 eng., column shift, o/drive, new tires, r/h, $425. Hawthorne, OS 5-1787. A

Corvair Deluxe, 1960, auto. trans., low mileage, $795. Hawthorne, OS 9-8620. A

Refrigerator, Frigidaire, 13 cu. ft., l-h door, $60. Gardena, DA 9-4451. A

MG-TF 1500, 1955, wire wheels, new top, $675. Manhattan Bch., FR 2-0540. A

Piano, upright, recently tuned, $100. Rolling Hills, FR 7-1687. A

House, 2-bdrm., 65'x160' lot, 3-yrs.-old, completely furn., close to Lake Elsinore & Lake Matthews, $11,000. Gardena, DA 4-1593. A

Freezer, 21 cu. ft. chest, Coldspot, $135. Redondo, FR 8-2609. A

Sewing Machine, Montgomery Wards console, $25. Redondo, FR 4-2440. A

Tohatsu 50cc, 1963, 55-mph, $140. P.V. Est., FR 5-8801. A

Speaker cabinet set, ¾" mahogany ply, 12" co-ax speakers, labrinth sys., $30. Paramount, ME 3-0619. A

Olds Cutlass, 1964, V-8, auto. trans., p/s, p/b, r/h, w/w, $2550. Box 401. A

Studebaker Lark, 1959, stick shift, new motor, brakes, clutch & tires, good mileage, $525. Torrance, DA 9-9407. A

Camper, Pullman, all steel, fits fleetside pickup, dble. rollout top, full-size windows, $325. Gardena, DA 4-7623. A

Rambler American, super 2-dr., $150. Ventura Div., 498-3131, ext. 420. A

Kitchenette Set, maple, $35. Gardena, DA 9-7447. A

VW Camper, 1962 w/stove & ice box, $1200. Hawthorne, 675-9068. A

Range, O'Keefe & Merritt, gas, fully automatic, $150. Inglewood, OR 8-0636. A

Sax, Buescher Tenor, $125. Manhattan Bch., FR 4-6003. A

Range, Tappan, center grill, 4-yrs.-old, $25. Inglewood, OS 6-1475. A

Sewing Machine, White rotary, w/cabinet, $20. L.A. 36, 933-4551. A

Enlarger, 4x5 Federal, print dryer, 3 hard rubber trays, speed easels, many extras, $80. Compton, 635-3294. A

Car cover, VW or Porsche, custom, green, water resistant w/tiedowns, used twice, $15. Box 402. A

Cemetery Plots, Inglewood, Greenlawn section, adjoining, $700. Hawthorne, OS 6-8842.

Volkswagen 1500S sedan, 1964, FM radio & many other extras, $2325 or $2190 w/out radio. Torrance, 322-2152. A

Home, 2-bdrm., full dining rm., 1400 sq. ft., fireplace, detached 2-car gar., block wall, new ext. paint, landscaped, 3 miles to Norair, $23,500. L.A., PL 6-6845. A

House, 4-bdrm., 1¾ bath, utility rm., patio, built-ins, $37,750. P.V. Pen., 378-0120. A

Refrigerator & numerous other items, $20. Hawthorne, OS 6-1745. A

Accordion, 120-bass, Contello, $150. Gardena, 324-9132. A

Stove, gas, apt-size, 3½-yrs.-old, $30. Inglewood, 676-2958. A

Dressing Table w/mirror top, kidney-shaped, $4. Manhattan Bch., FR 4-8036. A

Bicycle, girl's 26", new tires, $18. Gardena, DA 4-8853. A

Plymouth, 1964, Sport Fury, 383 cu. in., torque-flite, vibrasonic sound, p/s, p/b, extras, $2500. Manhattan Bch., 372-4951. A

Range, Kenmore, apt.-size, gas, deluxe, used 2 yrs., $35. Canoga Park, 340-7120. A

TV, Silvertone 24", cabinet, 3 speakers, $75. Gardena, DA 4-4625. A

Ranchero pickup, 1964, V-8, p/s, 4-spd., $1699. Malibu, 457-2979. A

Chair set, 6 captain's, solid maple, $70. Rolling Hills Est., FR 5-6114. A

Divan & chair set, custom, 6-mos.-old, beige brocade, $275. Hawthorne, 676-0787. A

Chevrolet, 1959 Impala, conv., nylon top, p/s, w/w, $650. L.A. 62, AX 1-5280. A

Mobile Home, 1963 Accent, 10 x 55', 1-bdrm., furn., 30' alum. awning, air cooler, $4200. Orange, 637-4194. A

DeSoto, 1953 4-dr., r/h, auto., $50. Anaheim, PR 4-2779. A

Ford, Model A coupe, 1930, completely restored, eng. needs work, $450. Hawthorne, 675-0014. A

For Sale

House, 3-bdrm., 1½ bath, laundry & utility rm., block wall, sprinkling sys., newly redecorated, 2½ miles to Northrop, $23,750. Gardena, DA 4-1593. A

Pups, miniature Dachshund, AKC reg., 4-wks.-old, $55 & $50. Torrance, FR 5-1660. A

Jointer w/motor on stand, 4" Craftsman, $50. Orange, 714-897-6992. A

Units, 4, deluxe, near Norair, 6-mos.-old, $69,500. Hawthorne, 676-6134. A

Dachshund, miniature red, female, 3-yrs.-old, $35. Gardena, DA 9-4675. A

Camper, 8', slide in w/ice box, closet & dble. bed, 66" high, $325. Yorba Linda, 528-5979. A

Yamaha, 1963, 55 mj2, extras, $175. L.A., 645-1523. A

Wanted to Buy

Bass Trombone. Culver City, VE 9-5438. B

Lawn Edger-Trimmer, elec. Harbor City, 325-0221. B

Comp. Hood for 1959-1962 Sprite, any cond. Lawndale, 371-3472. B

Shotgun, 12 or 16 ga., under $30. La Mirada, 714-521-1516. B

Cabinet, redwood, approx. 6' x 6'. Hermosa Bch., FR 2-6556. B

House in Hawthorne, Hollyglen area. Hawthorne, OS 9-6247. B

Drafting Machine, Bruning. Redondo, FR 4-2915. B

For Trade

Organ, elec., Thomas, walnut finish, trade for piano in good condition. Box 403. C

Boat, 14' Fiberglass, 5½-hp motor & trailer, trade for Bell RT 360 w/DK-1 accessory kit or equal tape recorder. Santa Ana, 543-0809.

Rentals Offered

Apt., 2-bdrm., unfurn., carport, 20 mins. to Northrop, 1 or 2 children ok, $90. Lynwood, 635-3784. E

Apt., 1-bdrm., 1½ bath, close to El Camino College, $95 unfurn., $110 furn. Lawndale, 322-1133, 370-6406. E

House, 2-bdrm., carpets, drapes, stove, $115. Torrance, 320-2002. E

Sleeping Room, util. paid, furn., near Northrop, pvt. entrance & bath, $45 mo. Hawthorne, 676-7328. E

Studio Apt., 2-bdrm., unfurn., 1½ bath, 2 blocks to Northrop, $125 mo. Hawthorne, 679-0622. E

Apt., 3-bdrm. studio, 2 baths, pvt. patio, closed gar., forced air heat, 2 children OK, $165 mo. Torrance, FR 5-0867. E

House, 2-bdrm., children OK, no pets, water & trash pd., $105 mo. Lawndale, 371-6775.

Apt., unfurn., 2-bdrm., pool. $125. Torrance, 323-1946. E

Duplex, 1 story, children & pets OK, range & refrigerator avail., fenced yd., $70 mo. Lawndale, 675-9389. E

Duplex, 3-bdrms., builtin range, $160. Torrance, 323-9349. E

Apt., 1 & 2-bdrm., unfurn., walk to Northrop, $95 & $110. Hawthorne, 675-2075. E

Rentals Wanted

House or apt., 2-bdrm., Inglewood, Hawthorne or beach. L.A. 47, 754-3962. F

Personals

We wish to express our gratitude for the many expressions of sympathy & offers of assistance received as a result of the loss of our daughter, Carole. Your desire to share our grief has touched our hearts & made these moments more bearable. MR. & MRS. A. R. SPRING.

Will do your typing in my home, term papers, theses, etc. Inglewood, 755-2436. L

For Sale or Trade

Chevrolet Impala, 1964 SS, 4-spd. pos. traction, $2150 or trade other car for my equity. Hawthorne, OS 6-7417. M

Chevelle Malibu S.S., 1964, 283 eng., 4-bbl., 4-spd., 10,000 miles, p/s, vibrasonic radio, w/w, $500 & take over $1850 bal. or trade equity for 1958 Chevrolet Impala. L.A. 43, PL 1-6203. M

Chevrolet pickup, 1964, all extras, low mileage, $1850 or trade for late model Volkswagen. Inglewood, OR 5-4905. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

8 a.m. — 4:45 p.m.

Crenshaw Blvd. & 180th St., Torrance. Bonnie Condon, ext. 617, 324-2435. 5

Rides Offered

8 a.m. — 4:45 p.m.

Crenshaw Blvd. & 180th St., Torrance. Bonnie Condon, ext. 617, 324-2435. 15

NSL Satellite En Route to Launch Site

The OV2-1 satellite, developed and built by Northrop Space Laboratories, is on its way to Cape Kennedy this week where it will be installed as a bonus payload on a development launch of the Titan III.

The satellite received a red-carpet sendoff last Friday as more than a dozen Air Force officers were the guests of Northrop President Thomas V. Jones, Vice President and NSL General Manager Dick Horner and NSL Vice President and Assistant General Manager Roy Jackson.

During the two-hour completion celebration at NSL, the Air Force guests received a complete briefing on the OV2-1, viewed a film on its development and were introduced to the project staff.

Testing of the satellite was completed the previous Monday, Program Manager Bill Armstrong said. Designed and built for the U.S. Air Force Office of Aerospace Research, the satellite will perform 14 space environment experiments.

At the ceremonies Friday each of the cognizant engineers—D. D. Shanks (systems testing), R. W. Mann (electronic systems), H. E. Hotz (mechanical systems), and A. L. Debolt (experiment integration)—introduced members of their respective staffs.

ANAHEIM LADIES PLAN TWILIGHT GOLF LOOP

Daylight Saving Time is just around the corner and the par chasers among Nortronics (Anaheim) ladies will take full advantage by conducting a Twilight Golf League.

Action gets under way May 19 at the Brea Golf Course, 501 W. Fir St., Brea. First tee off time will be 5 p.m.

Entry deadline is April 19.

Fees will be $1.50 a night. including both green fees and prize fund. The first five-week fees, $7.50, must be paid in advance.

Entry blanks and further information is available through Pat Richards, commissioner, at ext. 795, Anaheim.

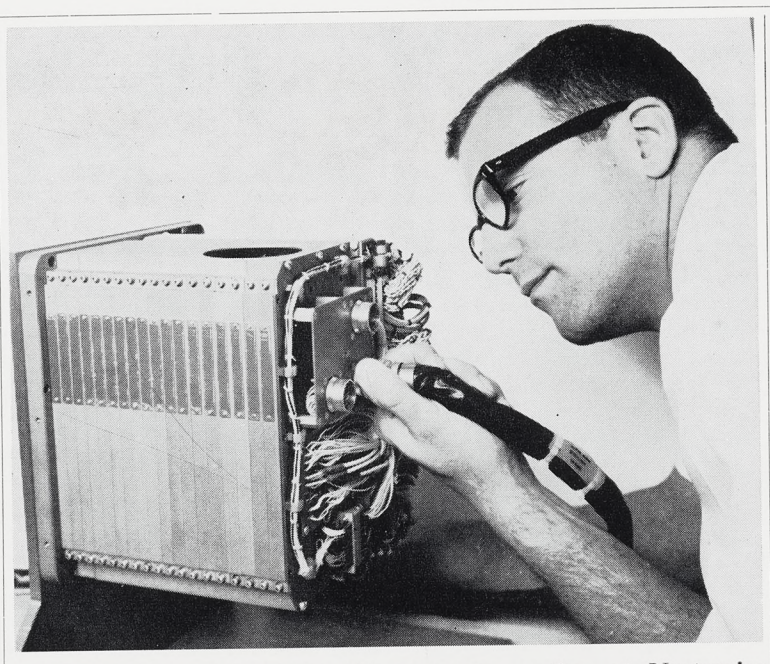
ADMIRAL

(Continued from Page 1)

servicemen through such enterprises as a day nursery.

The nursery now being established will be free of charge and will be designed to enable wives of enlisted men to obtain employment while their husbands are in the service, a spokesman said.

Contributions for the memorial will be monitored through the Navy Relief Fund.



Art Friedman, assigned to the computer section at Nortronics (Hawthorne), attaches cable to Northrop Nortronics' new NDC-1050 digital computer—the latest of Division's lightweight airborne, mobile computers. The NDC-1050, weighs only 14 pounds, and is about the same size as a car battery.

CLARY: Mariner Launched To 'Good Morning' Music

(Continued from Page 1)

a.m. Since the launch team was on radio tieups with Cape facilities, tracking stations around the world and JPL at Pasadena, Hugh skipped his song.

An unexplainable abnormality occurred when a certain command was transmitted to the spacecraft and the launch was scrubbed. Extensive tests for hours failed to produce a recurrence and decision was reached to launch the next day.

At 3:15 a.m. on the 28th, the countdown began again. The test director spotted Hugh, shook his head a couple of times and picked up the microphone.

Addressing the entire tracking network, JPL control center and Cape Kennedy loudspeakers, the director quietly announced that he was taking full responsibility for what was about to happen. He handed the mike to Hugh and directed him to sing his song.

Following the song, there was silence in Australia, Africa and other tracking locations; there was silence in Pasadena. But the launch team cheered for the first time in 24 sleepless hours.

They cheered again six hours later when Mariner lifted off its pad in a perfect launch.

After launch, team members were reassigned. Hugh Clary is now working in Division Proposals at Norair. Fellow proposal writers at Hawthorne needn't call the hospital next July if someone suddenly jumps up and starts singin at about time Mariner is due to automatically switch on its television camera. It's just Hugh making his last contribution to the Mariner program.

DOUBLES TOURNAMENT OPEN TO ALL KEGLERS

First annual doubles matched-game bowling tournament open to Northrop employees has been set for April 24-25 at Del Mar Lanes, El Segundo and Crenshaw Boulevards.

Entry forms are now available through Personnel Activities offices and must be submitted by April 19.

This will be a single elimination affair open to both men and women. Entry fee is $2.50 Teams may bowl as often as they like, although always with the same partner.

Northrop Donors Sought for May 11 Bloodmobile Visit

Solicitations begin next week throughout Northrop's Hawthorne complex in preparation for a May 11 visit of the American Red Cross Bloodmobile.

The immediate goal is to sign up 500 volunteer donors for the May visit. Donors are being sought from among Corporate, Norair, Northrop Space Laboratories and Nortronics employees working in the area. Other employees who plan to be in the area May 11 and wish to give blood may make special arrangements by calling exts. 2486 or 786 at Norair.

Approximately 300 pints given in quarterly Bloodmobile visits are sufficient to handle normal disbursements until the next scheduled visit.

Solicitation material, including instructions and signup cards, has been distributed to all departments. Donor cards should be returned by May 7.

The May 11 Bloodmobile hours will be from 7:30 to 11:30 a.m. in the NRC Clubhouse at Norair. Special shuttle transportation will be provided and individuals advised as to departure times and points.

Nortronics Anaheim NRC Good Time Table

For enrollment or information on activities listed below, call or contact Personnel Activities, Anaheim, ext. 1092.

ART, Ed Mosher
Meet Wednesdays, 7 to 10 p.m., Clubhouse, 1834 Valencia Dr., Fullerton.

BASKETBALL, Don Ross
Seasonal.

BIBLE STUDY, Marvin Wiebe
Meet Mondays and Wednesdays, 11 to 11:35 a.m., Y-1 room 339.

BOWLING, Chet Guzinski
Mixed Fives meet Tuesday evenings. Men's meet Thursday evenings.

CAMERA, George Baker
Meet 3rd Saturday, 7:30 p.m., Clubhouse.

COIN, Orville Mitchell
Meet 2nd and 4th Tuesday of month, 7:30 p.m.

DESERT RATS, Larry Anderson
Meet only to plan trips.

GEM & MINERAL, Bob Cornelius
Meet 1st Monday of month for business. Meet Thursday, 7:30 p.m. for working night, Clubhouse.

GUN, Pat Elliott
Meet 1st Tuesday, 7:30 p.m., Clubhouse. Second Saturday, 9 a.m., Silverado Sportsmens.

RADIO, Paul Staudenmayer
Meet at noontime and after hours, radio shack.

TABLE TENNIS, Jack Flannagan
Meet for play at noontime.

WOMEN'S, Elaine Steiner
Meet Monday evenings at various places.

Reeder Team Wins Scotch Doubles Tournament

Phil and Jerry Reeder put together a team total of 1191 pins to cop first place in the recent NRC-sponsored Nortronics (Anaheim) Scotch Doubles bowling tournament.

Second place went to Orville and Dorothy Fox with a total of 1185 pins, while Ray Martin and Marty Williams took third with an 1178 pinfall. First and second place winners hail from Nortronics (Anaheim), while the Martin-Williams duo represented the Johnson building.

Norair Division's George and Nancy Fujikami broke into the "trophy circle" by taking fourth for a total of 1178.

Twenty teams took part in the March 14 event which had each team member rolling alternately, regardless of the pinfall of the first member up.

Entry forms are currently available through Personnel Activities offices NSL, Norair and Nortronics (Hawthorne) and are to be forwarded to appropriate league secretaries. General information is available through Tom White, ext. 2486, Norair.

Leagues currently planned include:

Monday (6:30 p.m.) at Tropicana, a 12-man Mixed Four handicap loop; Tuesday (6:30 p.m.) at Tropicana, an 8-team Men's Scratch Trio; Tuesday (6:30 p.m.) at Missile Bowl, an 8-team Men's Scratch Trio; Wednesday (6:30 p.m.) at Del Mar, an 8-team Men's scratch trio; Wednesday (6:30 p.m.) at Missile, a 12-team Mixed Four handicap; Thursday (4:30 p.m.) at Del Mar, an 8-team Men's Scratch trio; Thursday (6:30 p.m.) at Missile, a 12-team Mixed Four handicap; Thursday (6:30 p.m.) at Gardena, an open Peterson Point loop; and Thursday (6:30 p.m.) at Southwest, an open Mixed Four handicap.

Swing shifters will stage a 1 a.m. Mixed Trio league after Friday night shifts (Saturday morning) at Tropicana that remains open.

Bowling commissioners and their telephone extensions are: Dick Miller, Nortronics (Hawthorne), ext. 692; Dorothy Baldwin, Nortronics (Hawthorne), ext. 268; Bill Myerson, Norair, ext. 4293; and Vi Jennings, Norair, ext. 2492.

Norair Ships Final RC-135 Assembly

A fitting finale to a 10-year subcontract program was written at Norair Division March 30 with the shipment of the final military outer wing assembly for the RC-135A transport to Boeing.

Like the 820 assemblies preceding it, the final assembly went out on schedule.

Norair entered the program to produce outer wing units in 1955 and is continuing production of similar assemblies for the Boeing 707 jet transport.

On hand for the final acceptance ceremony were Lou Gilster, Boeing's superintendent of outside Quality Control, and Fred Walker, Boeing Quality Control representative at Norair.

Norair's Jack Young, director of Quality Control, led Northrop representatives taking part.

DESERT RATS

Members of the Nortronics (Anaheim) Desert Rats will trek to Death Valley this weekend with Panamint City as the ultimate destination.

Jeeps will be utilized by the group as they explore ghost towns in the area.

BOWLING

Plans for Nortronics (Anaheim) summer bowling activities have been announced by NRC Commissioner Chet Guzinski.

Tentative slates call for Mixed Fours and Men's 480 Trio Scratch leagues to roll at Carter Bowl, Fullerton, beginning in May.

Sea Maids Flotilla Set For Colorado River Trek

The Sea Maids are preparing for their sixth annual canoe trip down the Colorado River.

The NRC-sponsored Girl Scout Mariner Troop will form a flotilla for the historic run during their Easter vacation.

Next Monday they anchor down their waterproof gear, including bed rolls, tents, food, etc., and shove off near Blythe. Their 11 canoes will be their transportation for the next five days and the power supplied through their paddles. They will exit the river at Martinez Lake.

En route, they will fish, swim, explore ghost towns, off-river lakes and some old mines.

Each girl making the trek is a qualified canoeist and has passed rigid tests. The Sea Maids have won many ribbons and cups for their canoeing skills in years past.

WITH A FLOURISH—The Sea Maids, NRC-sponsored Girl Scout Mariner Troop, are preparing for their annual Easter vacation flotilla down the Colorado River. And what could be more symbolic than the christening of a canoe for the journey with water from the Colorado. Girls will spend five days on river, explore many points.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 5 | April 21, 1965

NORTHROP STARTS ITS SECOND OV2 BONUS SATELLITE

Northrop Space Laboratories will design, develop and fabricate another OV2 space environment "bonus" satellite under terms of an $885,600 contract just announced.

Designated the OV2-3, the satellite will be built for the U.S. Air Force Office of Aerospace Research.

Working on the project will be the same NSL team—headed by Program Manager William C. Armstrong—which was responsible for the development and fabrication of the OV2-1, first Northrop-produced vehicle of the series.

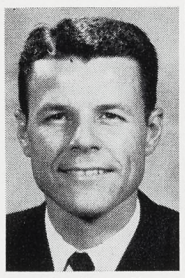
The OV2-1 vehicle is currently at Cape Kennedy awaiting launch later this summer aboard a Titan vehicle. Following fabrication and prior to its shipment, NSL ran extensive tests on systems and experimental integration techniques.

Both the OV2-1 and OV2-3

(See SATELLITE, page 6)

ASTRONAUT SLATES VENTURA VISIT

Astronaut Charles Bassett, who one day may be scheduled for a flight to the moon, will meet many of the people May 3 who are building the parachute landing systems for both the Gemini and Apollo spacecraft programs.



Mr. Bassett

Astronaut Bassett is a member of the third group of astronauts named by the National Aeronautics and Space Administration in October 1963. In addition to training for future flight in space, he has been assigned technical responsibility in astronaut training and flight simulation.

His whirlwind visit to the West Coast will include a tour through the Northrop Ventura plant, a brief talk to employees, and an address before the Northrop Ventura Management Club in the company cafeteria.

There's a Lot to Like in ALOTS, but... It's Only the Start for Flying Trackers

The Artists

Jangling telephones spread the word through the ALOTS task force section of Nortronics (Palos Verdes) April 13 that "a show" was about to begin.

One by one the men casually walked to a neighboring building where the first Airborne Lightweight Optical Tracking System is being built for the Air Force Eastern Tracking Range.

The half dozen engineers saw a tiny light attached to a disc rotating in a pinwheel fashion.

A 70 mm camera lens began to move horizontally and vertically as the light rotated. An image flashed on a console screen a few feet away. A dot of light appeared in a square on the screen.

Suddenly there were more grins per capita in the room than you would find at a Laurel and Hardy film festival.

It was the first time the assembled ALOTS had been tested with a moving object.

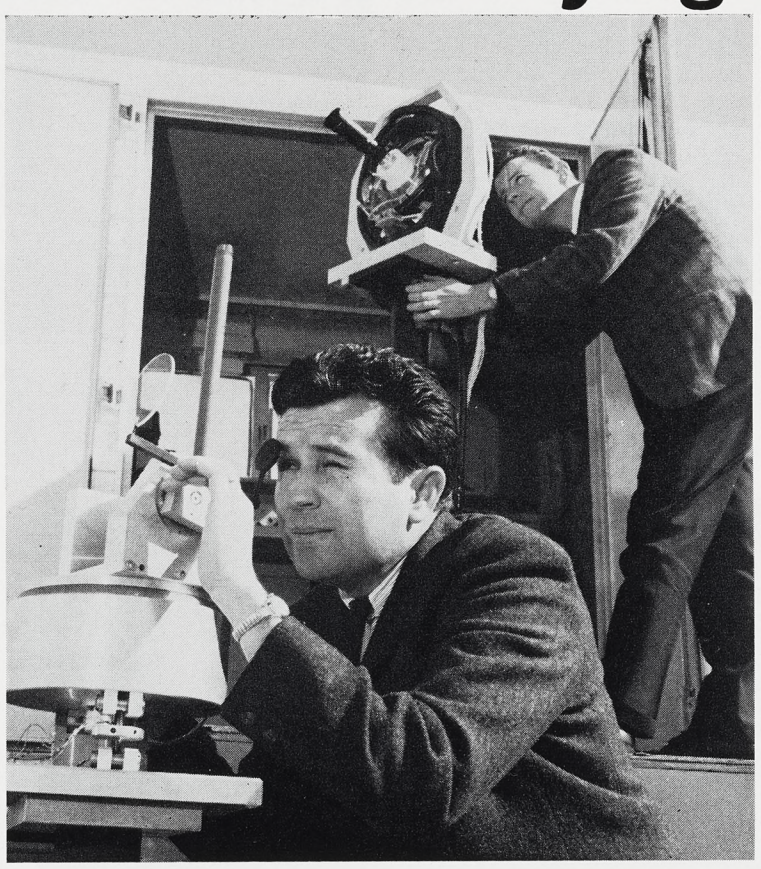
Behind every member of the task force is a unique story of achievement.

Responsible engineers, under whose technical direction the first airborne, long focal length, high resolution photographic system is becoming a reality, are Jaime Oaxaca (electronics), Lavere Moesser (mechanical and optical) and Bert Johnston (systems).

Ken Paulson is not only responsible for structural analysis, he is coordinator of Nortronics activities with those of Lockheed Aircraft Corporation, which is modifying a NKC-135 aircraft to carry the system.

Mr. Paulson conceived the idea of a "whiffle tree" mounting for ALOTS' 300 pound optical window and solved a tremendous

(See MEN, page 6)



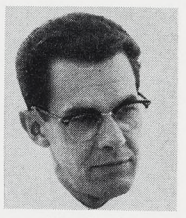
BIRD WATCHING—Lead engineers John Flannery (servos) and Jaime Oaxaca (electronics) check out two-axis tracker at Palos Verdes prior to tracking tests at Cape Kennedy. Two-axis tracker has been adapted to airborne tracker now in development stage.

State of the Art

Recent developments in optical tracking at Nortronics (Palos Verdes) have elevated Northrop capabilities in airborne photography systems and have launched what may be a new era in tracking missiles and space vehicles.

A demonstration at Cape Kennedy last month during the Ranger IX and Gemini III, space shots brought one portion of the Nortronics hardware before the eyes of the aerospace and defense industries.

A two-axis ground-based tracker locked onto Ranger and Gemini prior to launch and, through video cameras, gave observers around a closed circuit television screen a closeup view of the vehicles until they were more than 40,000 feet above the Florida coastline.



Mr. Gantz

Observation of a missile when it passes through the high dynamic region (around 50,000 feet) is important in studying the effects of dynamic stresses on the vehicle.

Highest dynamic pressure, which occurs when the missile reaches its maximum velocity before leaving the earth's atmosphere, can twist and bend the missile's structure.

The Division is nearing the flight test stage of a system which will go airborne in order to photograph when cloud conditions interfere with ground based systems.

This system (ALOTS, see page 2) advances the state of the art in airborne photography, according to Project Engineer Jack Gantz.

(See TRACKING, Page 6)

Peace Corps Recruiters Scheduled for Northrop

Northrop will cooperate with Peace Corps officials in conducting an in-plant recruiting program, it was announced today by Corporation President Thomas V. Jones. At the request of Peace Corps Director Sargent Shriver, Northrop will schedule interviews next month for Washington representatives with qualified employees who have expressed interest in joining the Peace Corps.

Further details on interviews will be announced in the next issue of NORTHROP NEWS.

"The success of the Peace Corps in 46 developing countries has generated a growing demand for Americans with mechanical, manual and general administrative skills," Mr. Shriver wrote in his request for Northrop's assistance.

"To meet these demands, the Peace Corps is soliciting the active cooperation of American industry."

In his acceptance of Mr. Shriver's invitation to participate in the program, Mr. Jones wrote:

"I consider that all of us in industry should take every practical step in support of the fine work which the Peace Corps is doing . . . I sincerely trust that a useful program can be developed."

The Peace Corps is open to any American citizen over 18 years of age, provided he has no dependent children under 18. Corps criteria in no way rule out acceptance of sprightly grandfathers or former Northrop employees who have retired but still maintain administrative or technical skills.

Anaheim Bowlers Plan Dinner-Dance

Nortronics (Anaheim) NRC-sponsored bowling leagues are planning a gala "Spaghetti Dinner and Dance" May 1 at the NRC Clubhouse, 1834 Valencia Drive, Fullerton.

Tickets are $2 a person and are now available through league secretaries and the Personnel Activities office.

Korea Gets First F-5's in Far East

Initial deployment of the Northrop F-5 in the Far East moved one step closer early this month with the arrival in Korea of the first squadron of supersonic fighters destined for use by the Republic of Korea Air Force.

Joint announcements heralding the arrival were issued by U.S. Forces Korea and ROK Air Force headquarters.

Also destined to receive the F-5 in the Far East under present commitments are Nationalist China and the Republic of the Philippines.

In Korea the Northrop F-5 will be phased into the ROK Air Force as a replacement for aging F-86 fighters that have been the backbone of air defense in the Republic of Korea since the Korean War.

TOOTH FOR TOOTH

In the Moonlight She Searched

Who else but a mother whose son has just had his three front teeth knocked out would be down on her hands and knees crawling in a darkened parking lot at 1 o'clock in the morning?

"Anyone who saw me there would have thought I was losing my mind," says Nortronics secretary Jean Buchanan, "but actually I was finding something — my 16-year-old son's teeth."

After "crying for four days and nights" when son Lauren came home with a big toothless grin last month, Jean was just settling down to her first restful sleep in a week. She bolted up about midnight and, "driven by an irresistible urge," grabbed a flashlight and, still in her robe, drove to the scene of her son's fateful fracas.

As luck would have it, she found the two incisors and a canine, and they weren't gummed up too badly from four days in a parking lot.

Jean couldn't control her excitement and ran straight to a telephone to call her dentist.

"I found them," she cried, "can I bring Lauren down right now?"

The dentist was also excited, but suggested that after four days another few hours wouldn't make any difference. Jean didn't know it at the time, but if she had found the teeth within 30 minutes after they were knocked out, nerve and blood vessel connections could have been restored. As it is now, Lauren has his teeth, but they will only last about 10 years.

Regardless, a delicate operation then restored Lauren's complete smile.

The dentist praised Jean's determination, but Jean is convinced it was divine inspiration that sent her out to the parking lot in the wee hours.

ALOTS Begins New Era in Airborne Photography

NORTRONICS OPTICAL SYSTEM OPERATES ABOVE WEATHER

Memo to Major League baseball:

"If you're having trouble keeping track of tape-measure home runs because your sluggers are hitting the ball too far and fast to find, Northrop has a camera system which can automatically track the ball, give you high resolution television pictures and show closeups in such detail that grass stain on the ball is detectable—all from a distance of 12 to 15 miles away.

"The only drawback is you'll have to consider the prior claim of the Air Force, which awarded a contract for such equipment to Nortronics Division."

The system—called ALOTS (Airborne Lightweight Optics Tracking System) — is scheduled for its first operational tests in six weeks, prior to delivery in July to the Air Force Eastern Test Range.

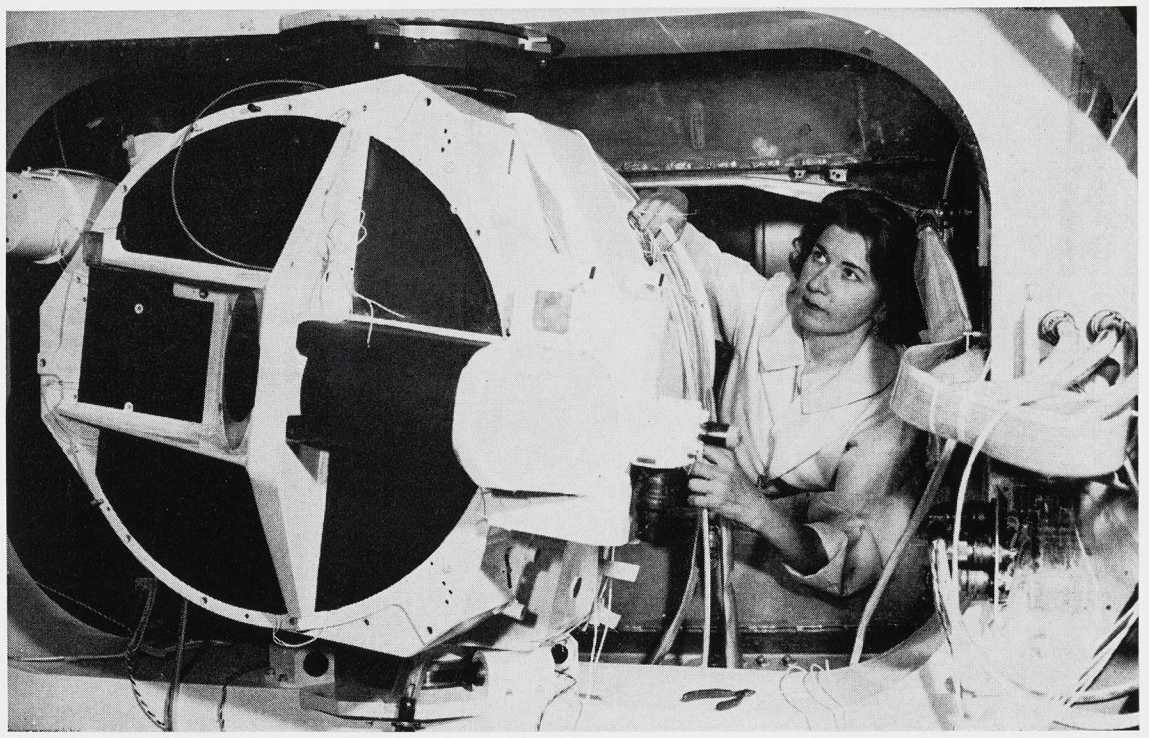
AFETR is more interested in tracking missile shots than baseballs, even during photography-inhibiting weather conditions. ALOTS fills the bill by operating from 40,000 feet, which is above 75 percent of the earth's atmosphere.

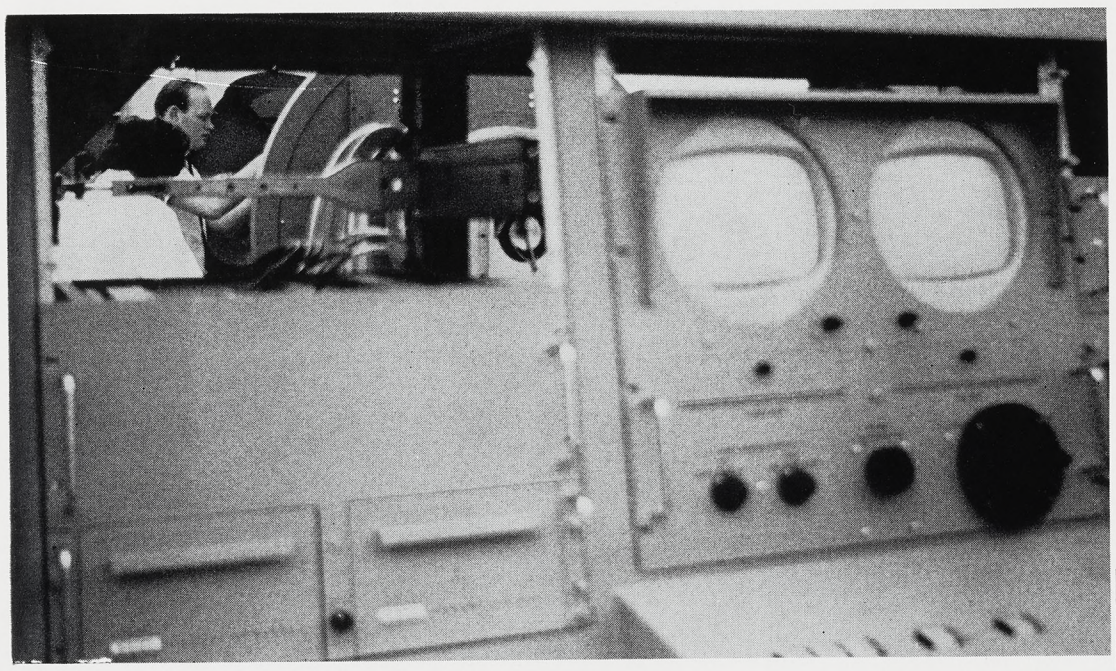
The camera system is designed to photograph missiles during the early launch, passage through the high dynamic pressure region, staging separation and re-entry phases of flight.

Included in the ALOTS package are a manual tracking station, an automatic tracking system, a photographic system and a control console.

Specific components include a 200-inch focal length telescope, a 70 millimeter photo-

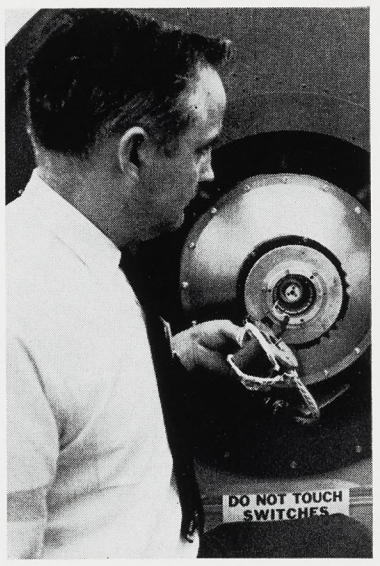
(See ALOTS, Page 5)



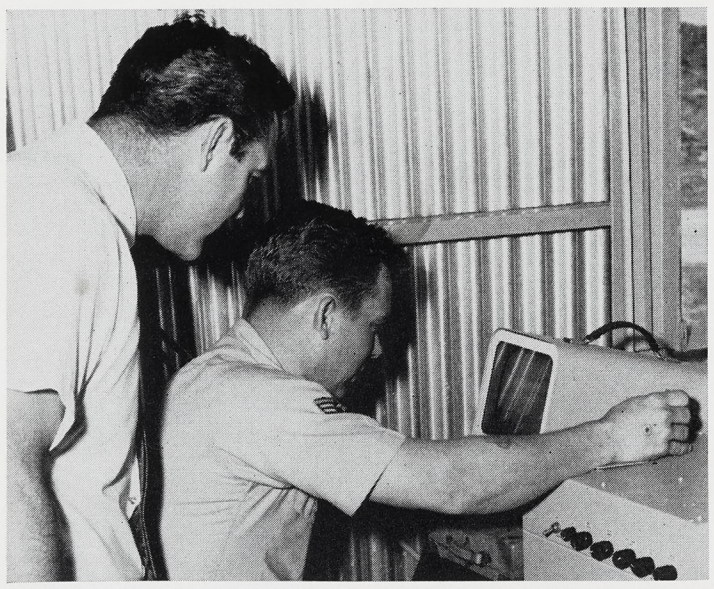


INSIDE THE POD

Technician Betty MacKenzie wires automatic tracker and photographic system, one of three components of ALOTS system. Mounted on turret inside pod, automatic tracker will be attached to door of cargo plane. Control console (left) when completed will be installed inside the plane. Technicians working on pod are seen through missing panel. Entire system is depicted (below) in artist's concept.

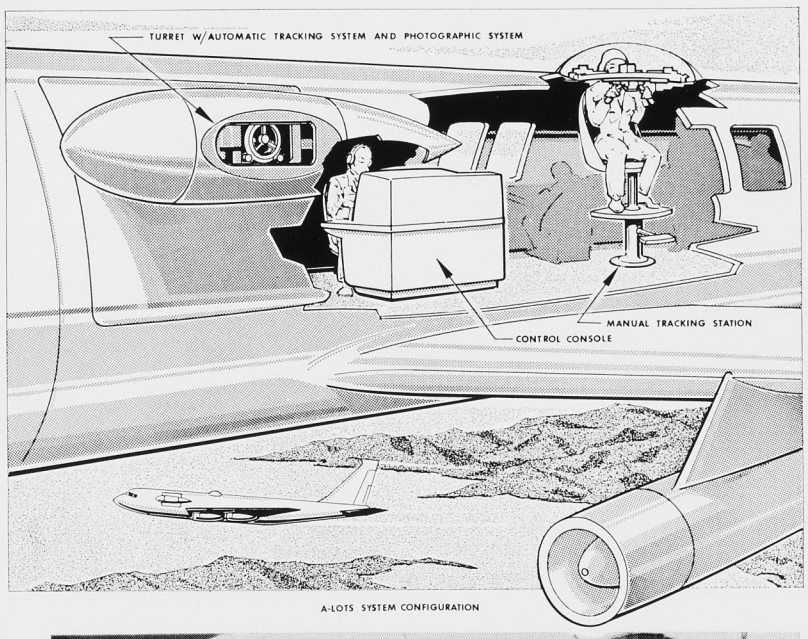


Vere Moesser

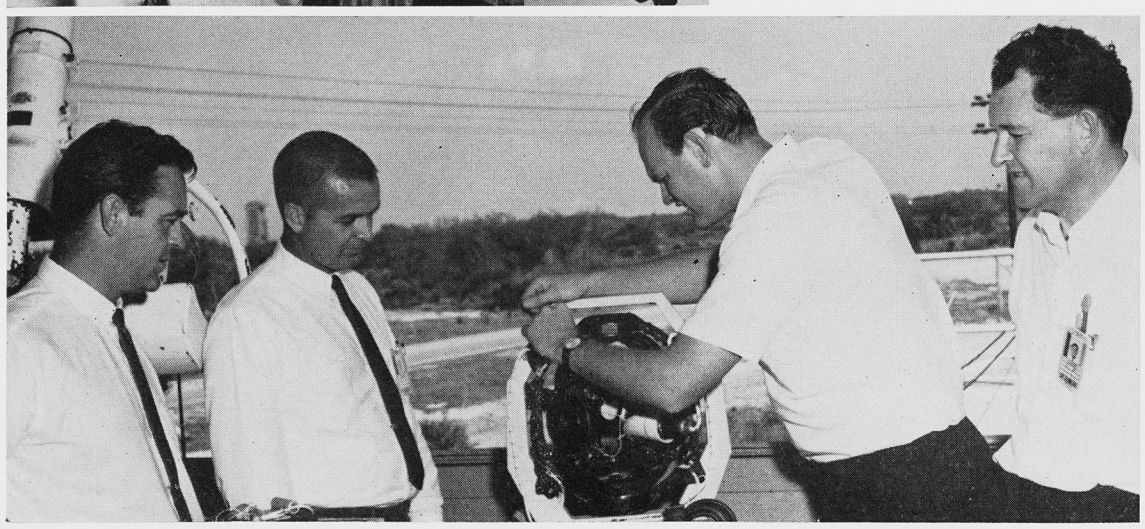


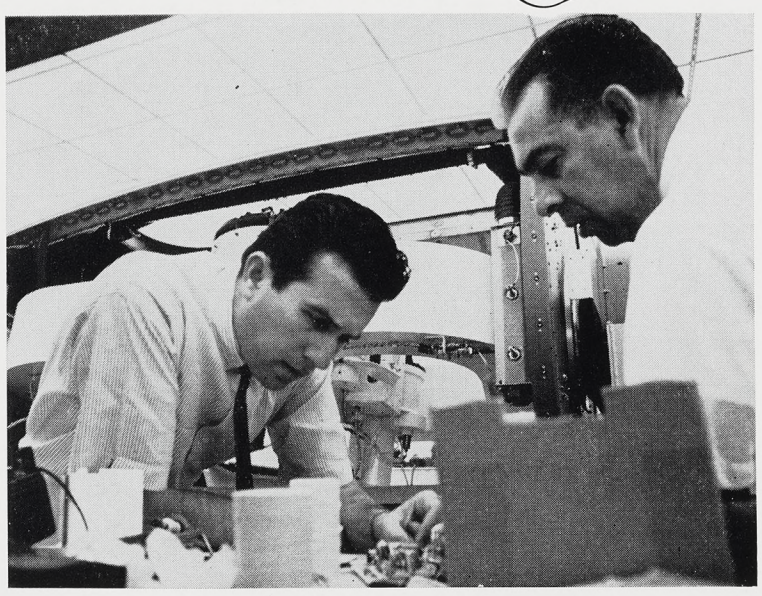
BREADBOARD MODEL

Two-axis tracker, described as breadboard model for ALOTS system, is set up for test assignment at Cape Kennedy (below). Nortronics' Dave Conklin (second from left) reported complete success in tracking recent Gemini and Ranger IX flights. Air Force technicians (left) at Cape see missile in flight in real time with Nortronics-built photographic-tracking system.



A-LOTS SYSTEM CONFIGURATION





Mario Artavia (right) sniffs for smoke.

FOR LESSONS WELL LEARNED—Initial participants in a special Industrial Work Experience program receive certificates on completion of Norair-based work period from C. Z. Stine, supervisor of Industrial Training. Graduates (from left) are Dorothy McGlothen, Ruth Robbins, Ann Madison and Gilbert Lanoix. Second group of eight students is now in similar program.

Second High School Group Starts On-the-Job Training

Northrop Norair has welcomed its second group of students taking part in a special Industrial Work Experience program. The students, four boys and four girls, are all full-time students at either Manual Arts or Dorsey high schools and are in their 11th or junior year.

From 8 to 10:30 a.m. each weekday they are at Norair to gain actual on-the-job training. The girls work in such functions as Personnel, Communications, Mail Service or filing activities, while the boys' time is divided between assignments in Tool Engineering and Fabrication. They will continue their Norair association throughout the remainder of the current school semester.

The students are afforded a rare opportunity to observe industry in operation. And they receive credit through their schools for their part in the program.

Their Norair training is one-half of a special course. The other half consists of classroom studies. The entire program is aimed at motivating the students to take additional courses, as a result of their observations, they will better prepare them for potential jobs in industry following graduation.

Norair began its association with the program in February as one of the first industrial firms to support the concept. At that time four students (from Manual Arts) began a similar work schedule, graduating April 9.

Studies are currently under way to determine if the Northrop participation can be expanded still further to include other schools and still more students.

Norair exercises no control over the selection of students, other than specifying that those picked by the school be average youngsters making average grades.

Administration for the program is provided by the Norair Education and Training group of Industrial Relations through C. Z. Stine, supervisor of Industrial Training.

HUNTSVILLE MAN IN SYMPOSIUM

Contracts Administration Supervisor Robert Langford of Northrop Space Laboratories' Huntsville section recently participated in the second annual Southeastern Symposium on Government Contracts at Cocoa Beach, Fla.

Mr. Langford is the current president of the Huntsville chapter of NCMA.

CMIP Savings Hit $40 Million; Continued 1965 Support Urged

EDITOR'S NOTE: As one of the most important continuing activities at all Northrop divisions, the Cost and Management Improvement Program will be reported by the NORTHROP NEWS in a series of in-depth articles, as well as news and feature stories.

With the addition of figures from the first six months of fiscal 1965, Northrop brought its total savings in the Cost and Management Improvement Program since formal implementation in 1963 to more than $40 million, it has been announced this week by Ken Hornor, Corporate coordinator.

Mr. Hornor

The most recent Corporate report to the Department of Defense revealed $3.78 million in savings tabulated to date in fiscal 1965.

This year's total includes 584 separate items accepted and documented by all divisions and offices. Contributing to cost reduction were activities such as value analysis, systems and procedures, suggestion awards, operation roundfile, automated operations control, cost and price analysis, and budget administration.

The over-all Cost and Management Improvement Program (CMIP) was established in 1963. Consequently, as one of the few companies experienced in such a full-scale program, Northrop cooperated with DOD officials in their setting up of official DOD guidelines in 1964, which defined an effective contractor cost reduction program.

The Corporation tallied more than $22 million in savings the first year and last year logged more than $14 million.

"At the present time," Mr. Hornor said, "the Corporation is under its goal. However, reports from Division coordinators indicate that the backlog of reports that have not been processed as yet will bring us close to our goal by the next report."

However, he added, the need for increased attention on reporting savings still remains during the remainder of the current reporting period.

Divisional representatives on the Corporate CMIP committee are Warren Sparks, Norair Division; Bob Irving, Northrop Space Laboratories; Bob Barrett, Nortronics; and Les Hudson, Northrop Ventura.

Richard R. Nolan, vice president-Manufacturing and Administration, in addressing a meeting of division coordinators this month, reported that President Thomas V. Jones was still committed to his pledge of December 1963 "that efforts of every individual associated with Northrop would be directed with new emphasis to the achievement of high quality production at the lowest possible cost on all government contracts."

Mr. Nolan, who was instrumental in getting the original CMIP started when he was general manager of Norair Division, told coordinators that "while we support the DOD program, it should be noted that the primary benefit is to Northrop."

"In view of the company benefits and our commitments to the government, it is essential that we continue to have an effective CMIP," he said.

Norair Division, which last year exceeded its goal by 22 percent, has set a goal of $7.2 million this year.

According to Division Coordinator Sparks, Norair was running slightly under its goal at the end of the second quarter.

"There has been considerable delay during the past quarter in preparing individual reports due to the large scale proposal activity in progress," he said, "but we feel our record will improve during the third quarter."

Mr. Sparks further reported a backlog of 750 active suggestions.

"This coupled with a full slate of pending value analysis projects should be sufficient to put us back on schedule by the end of the third quarter," he said.

TWENTY-ONE BOXES PER SHIP—Lena Baker, left, and Foreman Dick Economy look over a few of electrical relay boxes used on T-38 and F-5. Mrs. Baker submitted suggestion that eliminated masking operation, saving four minutes per box, plus materials. She earned $103 award.

Eliminating Step Wins Cash Prize For Lena Baker

A Norair Division inspector, Lena Baker, recently parlayed sound reasoning and initiative into a nice personal award ($103) through the Suggestion Award program.

Mrs. Baker noted the 21 electrical relay boxes used on each T-38 and F-5 were going through an unnecessary step. That is, masking was being applied to one side while Glyptol enamel (for insulating) was being painted on, then taken off and applied to the other side while Epoxy enamel (for appearance and durability) was being applied.

Her idea was to eliminate masking by first spraying on Glyptol, then Epoxy, since an overspray of the latter did not affect the former.

Her idea saved four minutes per box, plus the cost of masking materials.

You Can Still Buy Ice Capade Ducats

Tickets remain on sale through Northrop West Coast facilities for the special May 5 (opening night) performance of Ice Capades at Los Angeles Sports Arena.

Regular $3.50 tickets sell for $2.50.

Northrop folk will occupy a select group of loge seats in observance of a 25th anniversary being enjoyed this year by both Northrop Recreation Club and Ice Capades.

Tickets are available through Personnel Activities offices or Personnel offices at Norair, Nortronics, NSL and Northrop Architectural Systems; at the Ventura cafeteria; through Kelly Burke at Edwards AFB; Tom Post at Palmdale; Kay Cribbs at the Corporate office; and Polly Middleton at Mariposa Warehouse.

SPRING FITTING FOR NAS

Ex-Norair Man Sets Up Third Plant

There's a lot of difference between aircraft and sliding glass doors, but Ralph Froelich, production manager at Northrop Architectural Systems, still gives credit to his 10 years at Norair Division for his ability to set up a manufacturing plant for the Northrop subsidiary.

NAS growth since 1959 is reflected in Mr. Froelich's record —organizing three plants in six years in addition to his responsibilities in day-to-day production.

The newest facility is beginning to take shape in the City of Industry with construction scheduled for completion in July. While design of the production layout is wrapped up, Ralph is directing his attention now to transferring the whole operation from present facilities in the City of Commerce with a minimum of down time.

Mr. Froelich

Ralph's confidence in an orderly transition is bolstered by the fact he did it once before. When NAS moved to its present location from South Los Angeles in 1961, production facilities were transferred on weekends and not a single order was delayed.

The present situation is a little more difficult because of increased magnitude of equipment involved and a higher volume of backlog.

But procedures are being worked out to move equipment in sections and keep part of the assembly line running in Commerce while parts are being installed in Industry.

By operating out of two plants at once during the transition, Mr. Froelich believes there will be no interruptions in the steady line of trucks and rail cars carrying the Arcadia line of doors, windows and store fronts from NAS to market.

Fifteen years ago, Ralph was expressing the same confidence about shipping F-89's out of Norair at Hawthorne. He joined the Division in 1940 as leadman in sheet metal. He moved up to foreman and later joined a modification group for evaluation of aircraft performance, before being "borrowed" by Monrovia Aircraft Corporation in 1945 to set up production facilities there.

Back to Northrop in 1956, Ralph was general foreman of Sheet Metal Fabrication and was part of the group which began Norair's development work in titanium.

His background in production and metals made him an excellent choice in 1959 to organize and head an expanded manufacturing operation when Northrop purchased Acme Metal Molding Company.

The present challenge is the

(See FROELICH, page 5)

Ross Miller Co-Chairman For Seminar

Nortronics Vice President Ross Miller, has been selected by the American Management Association to serve as co-chairman of a workshop seminar concerned with "advances in program and project management."

The seminar will be held in San Francisco during a two-day management conference sponsored by the AMA on April 26 through 28. Mr. Miller who is manager of the Nortronics Division Technical department will share the session chair with Charles Martin of Douglas.

The two aerospace executives are particularly qualified to chair the management workshop session due to the leading roles they played in the development of the Skybolt missile. Mr. Miller was program manager for the Skybolt guidance system, while Mr. Martin was responsible for liaison with the British Government in behalf of the missile's prime contractor.

Instrument Society Sounds Papers Call

Leaders of the forthcoming (October 5-7) Eleventh National Aerospace Instrumentation Symposium to be held at the Ambassador Hotel are seeking persons interested in presenting papers.

The theme will be "New Measures of Progress in Aerospace Instrumentation" and papers should cover interesting new developments in aerospace instrumentation.

Norair's Henry M. Karaszewski, ext. 1933, is Los Angeles County chairman for the event.

MAYOR MAKES IT OFFICIAL—Northrop Coin Club, which is joining other numismatic groups in observance of National Coin Week April 24 through May 1, called on Hawthorne Mayor James Q. Wedworth (seated) to have official proclamation signed. Holding proclamation is Ann Hall, a Coin Committee member of Chamber of Commerce. Standing behind, (from left) are Frank Farmer, Northrop Coin Club president; Bob Hartman, Chamber secretary; and Foster Hall, Chamber Coin committee member.

NRC Numismatists Join National Observance

Whether for judging or jingling, coins will be in the limelight next week as Northrop Coin Club joins fellow numismatic enthusiasts across the nation in observing National Coin Week.

Theme this year is "Good Will Through Numismatics."

NRC's Coin Club will take part by exhibiting at various Hawthorne locations several displays of member's coins. One is made up entirely of silver Peace Dollars, another shows U.S. and foreign coins appropriately mounted on a world map.

Last week, as a prelude, Northrop Coin Clubbers called on Hawthorne Mayor James Q. Wedworth to witness a signing of an official proclamation declaring April 24 to May 1 as "National Coin Week" in Hawthorne.

SHIFTS WILL SHIFT FOR TIME CHANGE

Northrop Corporation employees in California will be affected by the switch to Daylight Saving Time, which occurs Sunday, April 25.

All California clocks will be set ahead one hour at 1 a.m. Sunday. Thus, normal work shifts for the following week will begin on the new time schedule or one hour earlier than the previous week.

X-21 Suggestions Earn Cash for Edwards Trio

Suggestion awards totaling almost $1000 have been paid a trio of Norair Division men at Edwards Air Force Base for their "Yankee ingenuity" as applied to the Northrop X-21 Laminar Flow Control (LFC) aircraft.

Each suggestion was different but involved the plastic filler material (Kemweld) used to build up certain areas of the LFC wing to required contours. This material is applied, then sanded to desired finishes.

Stan Lowry, an experimental flight test mechanic, worked out a special sanding tool which consisted of a turnbuckle adjustment enabling it to be fitted to various contours. Each man working on this type operation now has one or two units which improve quality and reduce time. Mr. Lowry received $796 for his efforts.

Robert Lane, a second experimental flight test mechanic, suggested thin shims, used to keep filler material out of wing slots, be cut to pre-determined width so that they also acted as gages to control filler thickness as it is applied, reducing subsequent sanding time. He earned $141.

Tom O'Malley, a Northrop pilot of company planes that serve Edwards AFB, noted some difficulties during sanding operations due to sharp contours and unusual shapes. He worked out an aluminum-back sanding unit with a flexible polyurethane buffer onto which sandpaper was attached. This enabled the men to shape the sanding unit to fit tight shapes, then reshape them for other shapes. He received $38 in Suggestion Award money.

Milt Kuska, Norair deputy assistant general manager — Technical, made a special trip to Edwards AFB to present checks and thank the men for their efforts. He was joined by Jack Farley, base administrator, and Roy Whites, supervisor of Experimental Flight Test.

Norair Gals Win Posts in Election By Secretaries

Half of the officers elected this month by the Airborne Chapter, National Secretaries Association, are Northrop Corporation employees.

Miss Weltman

They include: Marianne Weltman, president; Marge Stevens, first vice president; and Verlin Seaman, corresponding secretary. All are from Norair Division.

Elections were held April 8 and installation is set for June at the Fox Hills Country Club.

Meanwhile, the Northrop members are taking part in National Secretaries Week (April 18-24) and today (April 21) will participate in the formation of a new Beverly Hills chapter they have sponsored. Keynote address will be delivered by George Gore, Corporate vice president, general counsel, and secretary.

LITTLE FEET PATTER AT NSL

Life scientists at Northrop Space Laboratories this week were celebrating a special kind of Mother's Day a month early.

"After two years of frustration," zoologist Jerry Gambino said, "the NSL Life Science Department has scored a scientific first — the breeding of pocket mice in captivity."

There are two new mothers actually, each with a litter of four one-half inch long *perognathus longimembris*.

It was touch and go for two weeks after delivery, Dr. Gambino reports, but earlier this month the potential astromice explored their artificial desert environment for the first time as they moved outside their tin-can nest.

Staff researchers couldn't wait until the regular Mother's Day next month because family life is short-lived for pocket mice.

"Being solitary animals to an unusual degree," Dr. Gambino said, "the children turn on their mother about six weeks after birth. After driving her away they then fight among themselves for territorial rights."

Pocket mice are so inhospitable, he added, that no one knows yet how they stop fighting long enough to reproduce.

Aside from the zoologists' interest in the animal's behavior, space scientists are excited about the possibility of using them in space environment experiments.

Pocket mice don't drink water, exist comfortably for long periods of time in dark, cramped quarters and are smaller than other species now being used. They also have an unusually high tolerance to radiation.

Under contract to the National Aeronautics and Space Administration, NSL has been conducting continuing experiments and studying pocket mice for two years. The laboratory has also designed a space capsule which is tailored to *p. longimembris*.

Breeding the mice in a laboratory environment is essential in establishing a genetic history of future astromice. Other species presently being used are identified by their genetic strain (which may be traced back 50 or more generations), which allows scientists to more accurately determine the effects of experiments as well as allowing other scientists to duplicate their work with subjects from the same strain.

The Life Science staff was also interested in laboratory reproduction because members have frequently had to trek out into the Southern California deserts to round up a supply of pocket mice.

Recent successes were attributed to many months of around-the-clock surveillance by the staff and physiologist Page Hayden's injection of a new hormone in both male and female mice.

Reminded that Father's Day comes around in June, Dr. Gambino forecast little recognition for the two unsung heroes of the story.

It seems that a mother pocket mouse regards a father pocket mouse as some kind of worthless rat and expels him even before the young are born.

"What's this? Another photographer."

"His name tag says Bill Cox."

"I mustn't look afraid."

CLICK!

DIAMONDS FOR HIS LAPEL

Bob Johnston (left) is first employee of Ventura Division to receive Northrop 25-year pin. A senior designer, Mr. Johnston worked many years at Norair Division before transferring to Ventura. Vice President and General Manager George Douglas makes the presentation.

ALOTS: New Era Begins In Airborne Photography

(Continued from Page 2)

graphic camera operating at 80 frames per second and two vidicon sensors for tracking.

Automatic tracking and photographic systems will be integrated in a single mechanical assembly contained in an external pod mounted on the aircraft cargo door. Lockheed Aircraft Corporation is under contract to provide design modifications to aircraft which carry ALOTS.

The sensors cover both coarse and fine fields of view. After the coarse field (4 by 4 degrees) acquires the missile, the fine field (40 by 40 minutes) goes into operation and is the same as that seen by the recording camera of the photographic system.

All monitoring and control facilities not included in the manual tracking station will be provided by the control console. Two video monitor screens on the console display to the operator the coarse and fine tracking fields.

The Air Force has been interested in this type of equipment for some time, according to Project Engineer Jack Gantz. AFETR has been experimenting with existing equipment in order to determine prerequisites.

"This is the data we began with nearly a year ago," Mr. Gantz said, "and while Nortronics' system is relatively simple, there were a tremendous number of engineering challenges involved."

Responsible engineers helping to solve the problems were LaVere Moesser (mechanical), Jaime Oaxaca (electronic) and Bert Johnston (systems).

In designing and building ALOTS, the men overcame such obstacles as: airborne stability of the platform which holds the cameras; attaching the system to an aircraft; satisfying aerodynamic requirements yet retaining a wide field of view; design of windows to withstand temperature extremes yet not cause changes in critical focal length; and keeping operating personnel at a minimum.

With applications for the system continuously being developed, it will probably be a long time before baseball gets into the act.

FROELICH

(Continued from Page 3)

most difficult and probably the most rewarding, Mr. Froelich says.

Once moved, NAS will have a "model" production line. Addition of process steps, such as anodizing, will make the plant more self-sufficient. Production will be on a straight line arrangement from initial order to shipment and will reduce inventory, he added.

Best of all, for Ralph anyway, the new facilities should last a long time. NAS is more than doubling its acreage, and facilities include provisions for adding further process steps at a later date.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Wilmington Blvd. & Anaheim, Wilmington. Tom Henrich, ext. 680, 2138, TE 5-9070. 2

7:30 a.m. — 4:15 p.m.

Imperial & Main, El Segundo. Susan Taylor, ext. 1995, EA 2-0367. 3

8 a.m. — 4:45 p.m.

Covina Area, Pomona. Duane Heise, ext. 2255. 5

Rides Offered

7 a.m. — 3:45 p.m.

Avalon & 190th St., Gardena. Genaro Chapa, ext. 2568, DA 3-9447. 12

8 a.m. — 4:45 p.m.

Covina Area, Pomona. Duane Heise, ext. 2255. 15

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Ski Boat, 16′, Corvette motor, front & rear seats upholstered, trailer, $1995. Torrance, DA 9-9407. A

Skis, Blizzard metal slalom-type, 210 cm., $49. P.V. Pen., 377-5936. A

Cemetery Lots, Glen Haven Memorial Park, San Fernando, Sunny Slope sec., $600. Gardena, 327-4519. A

Bicycle, boy's 10-spd. Derailleur, $25. Inglewood, PL 5-4497. A

Cadillac, 1961 sedan DeVille, 37,000 miles, $1950. Fullerton, 714-529-3416. A

Refrigerator, Coldspot, 7.3 cu. ft., $25. Torrance, DA 5-3724. A

Height Gage, 12″ Browne & Sharpe, $45. Hawthorne, LO 7-3663. A

Dishwasher, Kenmore portable, faucet attachment, $75. P.V. Pen., 377-5319. A

Dishwasher, Kitchen Aid, $65. Torrance, 375-2290. A

Air Compressor, lge., Devilbiss, model 225, 30 lb. to 150 lb. pressure, $300. Inglewood, OR 8-2733. A

Studebaker, pickup, 1956, deluxe cab, 228 V-8 eng., column shift, o/drive, new tires, r/h, $425. Hawthorne, OS 5-1787. A

Yamaha YDS-3, 1965, 250 cc, auto. oil injection, $550. Norwalk, 864-7673. A

Camping Trailer, 16′, $350. Hawthorne, OS 9-1550. A

Home, custom 3-bdrm., 1½-bath, sep. dining room, lge. fenced lot, Hollywood Riviera, $31,500. Torrance, 375-1528. A

Buick, Roadmaster, conv., 1956, fully loaded w/extra equip., rebuilt eng., $175. Anaheim, 535-3305. A

Chris Craft, 14′, 16 hp, Mercury, trailer, spare tire & life jackets, $200. San Pedro, TE 1-3483. A

Lots & Cabin, Big Bear, water, elec. avail., $3825. Manhattan Bch., FR 2-3878. A

Pontiac, Catalina, 1964 conv., auto. trans., p/s, p/b, bucket seats, radio w/rear speaker, $2995. Santa Monica, 393-7464. A

Cessna Membership in Flyers, Inc. of Hawthorne, $300. L.A. 43, GR 3-9897. A

Dodge, 1958 9-pass. wagon, Sierra, r/h, full power, new tires, elec. rear window, $450. Torrance, 320-2827. A

Automobile Oil Filter, Luber Finer, complete, $5. Hawthorne, OS 5-5805. A

Pontiac, 1963 Grand Prix, factory air, full power, alum. wheels, $2950. Torrance, DA 4-8618. A

Movie Camera, Bolex 8mm titler & access. kit & editor, Bell & Howell 8 mm w/splicer, $125. L.A., 645-6556. A

Bunk Bed, captain's, w/2 drwrs., & cabinet space, maple, $50. Manhattan Bch., FR 4-3394. A

Buick Special wagon, 1962, auto. trans., power rear window, $1400. Inglewood, OR 3-4274. A

Tent, Genie 9′x12′ Air Kool, dble. door, floor, $30. Hawthorne, OS 9-4933. A

Twin Beds, dresser, night table w/21″ screen console TV, $125. Inglewood, 678-3318. A

Plymouth, station wagon, 1959, p/s, $350. Granada Hills, EM 5-7338. A

Home, 3-bdrm., 1¾-bath, lge. living room w/P.V. stone fireplace, utility room, fenced yard, $21,500. Walteria, 378-7742. A

Rambler Wagon, 1963, Classic 660, r/h, auto. trans., V-8 eng., new w/w tires, reclining seats, $1995. L.A., 326-6539. A

House, 2-bdrm., carpet, on R-3 lot, 50′x130′, low down pymt., $25,950. L.A. 56, AX 2-9489. A

Ford, Galaxie 500 XL, 1964 conv., auto. trans., $2300. Buena Park, 521-5047. A

BBQ, w/glassed-in oven & motor, utility shelves & plastic cover, $15. Gardena, DA 7-0872. A

Scooter, All-State, 3-spd. trans., luggage carrier, $140. Redondo Bch., FR 5-6439. A

STEREO, FM & AM, Granco, multiplex, 2-yrs-old, 20-watt unit, complete w/speakers, $70. Compton, NE 8-2222. A

Chevrolet, 1959, 4-dr., r/h, auto. trans., power steering, $695. Hawthorne, OS 5-4786. A

House, 2-bdrm., attached gar., large lot, $18,950. Torrance, FA 8-1872. A

Table, round, 4 chairs, chrome, $20. Inglewood, OR 7-2962. A

Volkswagen, 1961, $1050. Torrance, FR 1-3044. A

Horse, 6-yr-old white mare, ½ thoroughbred and ½ quarter horse, papers, 16 hands, trained English, western, jumping, $450. Rolling Hills Ests., 377-2101. A

Chevrolet, Malibu s/s, 1965, 4-spd. trans., r/h, tach., many extras, $2800. Hawthorne, 676-5012. A

For Sale

Home, 3-bdrm., 1½-bath, block wall, h/wood floors, corner lot, less than 2 miles from Anaheim facility, $16,950. Fullerton, 528-6914. A

Chevrolet, pickup, 1960, lge. bed, hvy. duty, $1000. Hawthorne, OS 5-2403. A

Bicycle, 24″, boy's, $15. P.V. Ests., FR 5-5097. A

T-Bird, 1959, Cruise-O-Matic, p/s, p/b, $1050. Whittier, OX 8-4740. A

TV, Zenith conso'e, 23″, 2-yr-old w/remote controls, $119. Hawthorne, OS 5-7938. A

German Shepherd, 1-yr-old, tan & grey, $20. Fullerton, 714-529-4788. A

Chevrolet, Nomad, 1956 Classic sta. wagon, orig. owner, $850. Venice, EX 6-3594. A

Stove, reg. size, Wedgewood, chrome top, $40. Hawthorne, OS 5-4322. A

Washer, Hotpoint automatic, $25. L.A., 757-4252. A

Cemetery Plot, Inglewood, Greenlawn section, adjoining, $350. Hawthorne, OS 6-8842. A

End Tables, coffee table set, mahogany, glass tops w/2 hand-painted porcelain lamps, $50. Pacoima, 882-0761. A

Bar, 8′, carved, upholstered in olive green, complete w/4 stools, $25. Inglewood, OS 5-7050. A

Refrigerator 9′, Philco, freezing compartment & door shelves, $90. Inglewood, 677-4540. A

Front Door, 35½″ solid core birch w/hardware incl., deluxe doorknob w/2 keys, $10. Gardena, 675-1005. A

Piano, upright, practice-type, full-size keyboard, cherry finished, $80. Manhattan Bch., 379-5366. A

Apts, deluxe, 4 units, 3-bdrm., 1½-bath owner's unit, w/w carpets, drapes & built-ins, close to shopping & schools, $57,500. Lawndale, 322-1133, 370-6406. A

Boat, 17′ 8″, V-8 60 inboard w/trailer, 4 life preservers, many extras, $700. Playa del Rey, EX 1-4860. A

Dodge, 1956 Coronet Lancer, 2-dr., p/s, recent o/haul, $295. Gardena, DA 9-2904. A

Chair, leather, red, large, $60. Thousand Oaks, 498-2867. A

Cadillac, sedan, DeVille w/air cond., all power, $350. Van Nuys, ST 4-2332. A

Washing Machine, 14-lb. capac., Norge, $135. Anaheim, 828-2440. A

Stereo, Wayfarer, for auto., 4 speakers, tapes, electronic track changer, $125. Downey, TO 2-9547. A

Cadillac, 4-dr., r/h, $195. Northridge, EM 3-1679. A

Ski Boat, Glen L. Missal, 16′ inboard w/trailer, $1500. Anaheim 714-776-8907. A

Auto Parts, 1960 Sunbeam, 2-dr., wrecked out front end, no radiator or front fenders, o/drive trans., $265. Compton, 635-3294. A

Washer, Kenmore, 2 speeds, $50. Hawthorne, OS 6-1048. A

Cabin Cruiser, 23′ Fly-Brdg, 150-hp Intercepter, bait tank, outriggers, sleeps 2, 6′ dinghy, 30-watt s.s. radio, $2300. Inglewood, OR 1-9591. A

Coffee Maker, Universal, $7.50. Downey, 923-8532. A

Chevrolet, Bel Air, 1961, r/h, stick shift, $725. Orange, 637-4194. A

Monza, 1962, bronze, $1200. Anaheim, 638-2857. A

House, 5-bdrm., 3½-bath, fireplace, gar., fenced yd., near grade school, 2800 sq. ft., $26,000. Pasadena, SY 5-0215, SY 4-7334. A

Crib, w/dbl. dropsides & Baby Pedic mattress, $28. Gardena, 327-2279. A

Sofa, Naugahyde, white, $20. Redondo, FR 5-0061. A

Camping Equipment, 9′x11′ tent, ice chest, extras, $135. L.A. 56, AX 3-0036. A

Tent, 9′x12′, hvy-duty canvas, $40. Manhattan Bch., FR 4-8036. A

TV, 21″ Magnavox, light walnut cabinet, about 6-yrs-old, $75. Gardena, 757-2383. A

Sleeping Bags, w/hvy-duty rubberized nylon air mattress, king size, 42″x48″, 3-lb. Dupont 88 Dacron, 2 air mattress pockets, bags zip together, $46. Torrance, 323-4257. A

Cabin Cruiser, twin outboard catamaran, 20′ long, 8′ beam, 2 50-hp Evinrudes, trailer & many extras, $2400, Torrance, DA 4-0341. A

Ski Boat, 18′, Chrysler powered, $3500. Norwalk, SP 6-1281, UN 5-8863. A

Dodge, Lancer, 1962, 770, 4-dr. sedan, r/h, w/w, auto. trans., $800. Reseda, 342-0362. A

Plymouth, 1955, 2-dr. sedan, r/h, auto. trans., 1-owner, $175. Torrance, FA 8-6839. A

Oldsmobile, 1963 Starfire, 22,000 actual miles, full power, all extras, $2300. Inglewood, OR 1-6702. A

Oldsmobile, Cutlass, 1964, V-8, auto. trans., p/s, p/b, r/h, w/w, $2550. Torrance, DA 9-5364. A

Home, 4-bdrm., family room, 2-bath, fireplace, pool & decking, fully landscaped, separate play yard, 2-car gar. w/hobby rm. area, $25,500. Santa Susana, 526-6804. A

Schnauzer, miniature, male, 6-mos-old, ears cropped & shots, champ. background, $175. Anaheim, 714-776-8956. A

Couch w/2 chairs, $100. Torrance, FR 5-2127. A

Oldsmobile, F-85 station wagon, 1961, V-8, auto. trans., r/h, w/w, $1375. San Pedro, TE 3-9455. A

Baby Bed, adjustable sides, $12. Hawthorne, 329-9484. A

Dog, poodle & scottie mix, 1-yr-old, female, black, $15. Gardena, 324-3760. A

Buick, Riviera, 1963, factory air, all power, Cruise-O-Matic, tilt-wheel, bucket seats, all extras, $3295. Inglewood, 671-3154. A

Refrigerator, International Harvester, 9 cu. ft., freezer across top, $75. Rolling Hills, FR 7-1094. A

Honda, 1965, model CA 95, under 1300 mi., $50 & take over pymts. or $500. Gardena, 676-5505. A

Tire Chains, 2 pr., one fits 700-15, 800-15, 900-14, other 760-15, 850-14, $12.50. Compton, NE 1-3627. A

Projector, 35 & 120 mm Davidson professional model, 500-watt, telephoto & wide angle lens, assemblies included, $30. San Pedro, TE 3-6037. A

Wanted to Buy

Tool Box, rollaway, also tools. Gardena, 4-9904. B

For Trade

Gun, Ruger 9-shot semi-automatic, trade for single-action revolver, any caliber. L.A., PL 7-7911. C

FREE (To Be Given Away)

Puppies, black, 6-wks-old, 3 males & 2 females, cocker spaniel-type. Lawndale, 323-0583. D

Poodle, silver grey, pedigree, papers, miniature, male, 2-yrs-old. Compton, 683-7740. D

Kittens, part Siamese, black, 1 all white, ready on or about May 21. Inglewood, 672-5578. D

Rentals Offered

Cabin, Green Valley Lake, by week or weekend, $35 weekend, $65 wk. Torrance, 320-2002. E

Apt, 1-bdrm., unfurn., garage, pvt. patio, near transportation, $78.50 mo. Gardena, DA 9-9195. E

Apt, 1-bdrm., deluxe, built-ins, pool, $90 mo. Redondo Bch., 376-2117. E

Apt, 2-bdrm., unfurn., all elec., pvt. garage, water & trash paid, $120 mo. Inglewood, 671-4310. E

House, 2-bdrm., sep. dining room, glass-louvered back porch, $125 mo. Rolling Hills, FR 7-4926. E

Apt, unfurn., 2-bdrm., 1½-bath, tub incl., laundry fac., plenty of cabinets & closet space, close to freeways & shopping, $105 mo. L.A. 44, PL 5-0630. E

House, 3-bdrm. & den, 2-bath, pvt. patio, $175 mo. Compton, NE 5-3250. E

House, 2-bdrm., close to shopping, water & trash pd., pvt. yard & gar., children ok, $100 mo. Lawndale, OS 9-8426. E

Home, 2-bdrm., furn., all elec., dble. gar., lge. lot, in Vista, $85 mo. Gardena, DA 4-7623. E

Apt, gar., 2-bdrm., upper, laundry fac., 3 blks. to King Harbor, $125 mo. Redondo Bch, FR 5-4436. E

Apts, 1-bdrm. & 3-bdrm., unfurn., pvt. patios, closed gar., $95 & $165 mo. Torrance, FR 5-0867. E

Apt, 2-bdrm., deluxe, dble. gar., children acceptable, $125 mo. Inglewood, 672-7855. E

Studio Apt, 2-bdrm., unfurn., 1½-bath, 2 blocks to Northrop, $125 mo. Hawthorne, 679-0622. E

Unit, owner's, 1800 sq. ft., 3-bdrm., 3-bath, family rm., fireplace, pvt. deck & 3-car subterranean gar. w/storage, built-in kitchen, soft water system, adults, $275 lease. Redondo Bch., 373-1143, 673-3298. E

Home, modern 2-bdrm., paneling, natural wood cabinets, fenced rear yd., water & trash paid, lease or $115 mo. Gardena, 374-6331. E

Apt, deluxe, unfurn., 2-bdrm., 2-bath, dish washer, fireplace, free hot water, play yard, 2 children ok, near Norair, $135. Hawthorne, 679-1358. E

House, 2-bdrm., trash & water paid, children ok, no pets, $105 mo. Lawndale, 371-6775. E

Child Care Offered

Child Care, licensed, playroom, hot lunches & snacks, references, $3 day. Hawthorne, OS 5-1884. G

Found

Contact Lenses, set, in white plastic case in K parking lot. Norair Plant Protection, ext. 1972. J

Personals

Interested Person share monthly cost, approx. $4.25 mo., New York Times newspaper, daily at Norair main gate, except Sunday. LO 9-9306. L

Thank You for all the good wishes sent our way during the past couple of weeks. MR. & MRS. L. H. WALTON. L

For Sale or Trade

Shotgun, J. C. Higgins model 20, pump, $60 or trade for small outboard engine, 3½ to 12 hp. Compton, 635-2747. M

Mini Bike, 3-hp Briggs & Stratton, $50 or trade for b-flat tenor sax. Gardena, DA 4-7209. M

NORTHROP NEWS

Vol. 23 No. 5

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

GASICH CITES NEED FOR LIMITED WAR TACTICAL FIGHTER

Requirements for a low cost, versatile tactical fighter—such as the Northrop F-5—to satisfy demands of air action in limited warfare continue to be evident, according to Welko E. Gasich, Norair Division vice president and assistant general manager-Technical.

Mr. Gasich made his remarks before the annual National Aeronautics Meeting of the Society of Automotive Engineers last week in Washington, D.C.

"To meet present requirements, a need exists for a lower cost, operationally flexible aircraft to supplement larger, aircraft such as the F-111," Mr. Gasich said.

Toastmasters Plan Speechcraft Clinic

Northrop Toastmaster's Club has completed arrangement for its annual Speechcraft clinic to be held May 6, 13, 20 and 27 and June 3, 10, 17 and 24 at the Cockatoo Restaurant, Hawthorne.

Open to all Northrop employees, the clinic will provide special instruction in handling group meetings, in constructive listening, thinking and speaking on the group level.

Cost for the eight dinners is $30, payable on enrollment. All registrations must be completed by May 5.

To register contact Personnel Activities offices at Norair or Nortronics or call NRC Commissioner Bill Justice at ext. 1805 (Norair) or AX 2-1461 evenings; Mike Luongo, EA 2-2186; or Ron Klein, 376-4771.

TASK FORCE MEMBERS—Part of ALOTS team gathered at desk of project secretary, Cheryl Collier (right) includes from left: Bert Johnston, Harold Shoulders, Les Lauck, and Manny Fimbres. Virgil Case (below) shared fabrication responsibilities with Bob Meffan.

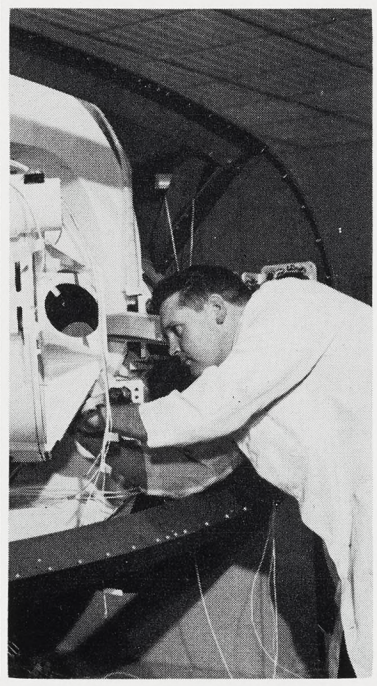
SATELLITE

(Continued from page 1)

vehicles have the same general configuration and dimensions, measuring approximately four feet square by seven feet high and employ a number of common subsystem equipment.

Like its predecessor, the OV2-3 is currently programmed to be launched as a bonus payload on a development flight of a Titan IIIC vehicle. Launch date will be set later this year.

Under terms of the new contract, NSL will design, develop and fabricate the OV2-3 and integrate into it 14 separate experiments. NSL will also assist the Air Force in monitoring the vehicle during its first month in flight while training USAF personnel to take over for the rest of the satellite's useful life.



MEN: Team Effort Paces ALOTS Projects

(Continued from page 1)

engineering problem by preventing window distortion due to dynamic loading.

One of the biggest smiles of all at the demonstration last week was carried by John Flannery. His seven closed loop servo systems within ALOTS checked out to expectations. Working with John on the servo circuits was Don Eakin.

Harold Shoulders gets credit for the two video tracking systems. Assisting him was Ken Getzin who is also responsible for all electrical interface definitions.

When the cameras began their synchronized motion, a huge sigh was heard from one corner of the room where Project Engineer Jack Gantz and Manny Fimbres were standing.

Mr. Gantz later confirmed that it was his sigh of relief which was heard. Manny knew all the time that the many subsystems which he had packaged into the pod would move as required without interference within the close confines of the turret.

Hiding Mr. Fimbres' incomparable gimbal system is the turret shell developed by Les Lauck, who also designed the ALOTS console.

Mario Artavia couldn't seem to control a nose twitch. As the man responsible for all wiring and electronic documentation, sniffing for smoke during the program checkout phase is instinctive with him. So far, all he has smelled is laboratory air.

The part that "really brings home the bacon" is the photographic telescope, designed and fabricated under the direction of Paul Halderman. Design help came from Paul Glamkowski, and Don Nicholson's optical staff, and fabrication of the precise optical elements came from Nortronics' Hawthorne facility under the direction of Otto Hartmann.

Art DeVany at Hawthorne is responsible for the fabrication of the optical system's heart, the telescope corrector plate.

Frank Crandell drew the difficult task of evaluating and predicting the systems' optical performance.

The two men on the hot seat, who were assigned to bring all the components together in a neat operating package, were the builders, Bob Meffan and Virgil Case.

While realizing the project is a 100 percent team effort, the NORTHROP NEWS still conducted an unofficial survey among members of the task force as to who was the most popular member.

To a man, they agreed that the task force would be "forceless" without Project Secretary Cheryl Collier to "keep order amid the disorder of busy men."

TRACKING

(Continued from page 1)

"It is composed of systems which individually have been within the scope of Nortronics capability for some time," Mr. Gantz said. "But in bringing them all together, we have a system that moves at Mach .8 and is, as far as I know, the only large aperture, long focal length video system that is on an aircraft platform."

Recovery of astronauts returning from space voyages may be photographed, with ALOTS, and Northrop employees may some day be able to watch on television as the parachute landing system the corporation manufactures goes into operation.

Growing potential of airborne tracking has prompted Northrop Nortronics to form a Range Instrumentation unit to work on such projects. The unit is presently headed by Mr. Gantz and composed of the ALOTS task force. It is part of the Tracking and Display Systems section, headed by Dave Conklin.

DANCING

New ballroom dancing classes for all Northrop folk will open under NRC sponsorship May 6 at the NRC Clubhouse, Hawthorne.

Each session will continue for 10 weeks.

NRC SPORTS

Golf, Softball Welcome Spring

Golf, for a weekend or the season, is being offered Norair and Nortronics par chasers through NRC activities.

The seasonal bit involves openings in three Twilite Short Course golf leagues forming. They include: Monday, 4:15 p.m. at Inglewood; Monday 5 p.m. at Alondra; and Tuesday at 5:06 p.m. at Alondra. The latter is a mixed league.

Further information on these leagues which open April 26 is available through Tom White, ext. 2486, Norair.

The big weekend is the NRC Golf Club-sponsored trek to Las Vegas May 21-23. Reservations for 160 have been made at the Dunes and a golf tournament will be held there May 22. Other activities include an awards party, dinner and a show. Total cost for golfers, which also includes green and prize fees and use of an electric cart, is $37.50. Non-golfers pay $27.50.

Reservations are being accepted at the Norair Personnel Activities office only.

* * *

DIAMOND ACTIVITY OFFERS DUAL CHOICE

The thud of bat meeting ball; the clack of cleats rounding the bases—softball season is back.

Norair and Nortronics enthusiasts have several possibilities open to them.

First, there is regulation softball available through teams entered in Southern California Municipal Athletic Federation activities. Contact Tom White, ext. 2486, Norair, for details.

Also on tap are two NRC-sponsored "slo pitch" leagues. Tuesday schedules will feature a loop using the 16-inch ball, while Wednesdays will be devoted to a 12-inch or regulation softball, still playing by "slo pitch" rules.

Signup rosters are available through Personnel Activities offices in the Hawthorne complex.

* * *

ZEPHYRS HEADED FOR NRC CROWN

Basketball season for NRC clubs is just about over and it seems highly unlikely any group will unseat the Zephyrs as the No. 1 NRC league team of the year.

Winners of the annual preseason tournament, the Zephyrs have roared through regular season play involving seven teams (from Norair and Nortronics) without a single loss. In fact, they lost only one game this year and that was to an outside group.

Manager Dolph McConnell has led the Zephyrs. Team members are Mel Overton, Henry Andrews, Charles Talbott, Alvin Hall, Jerry Naulls, Captain Vince Panaia (USAF), Blanchard Davis, Mose Smith, Skip Nelson, Shelton Williams, Edward Rogers, and Maurice Jackson.

NRC league action has centered at Lawndale High School on Tuesdays and Leuzinger High School on Wednesday since the first of the year.

* * *

DOUBLES TOURNEY SCHEDULE READY

Schedules for the first Annual NRC Doubles Matched Game Bowling tournament April 24-25 may be picked up from Personnel Activities offices beginning tomorrow (April 22).

Open to all Northrop employees, the event will feature men and women's qualifying rounds April 24 and elimination rounds April 25, all at Del Mar Lanes, Crenshaw and El Segundo.

GAGE TOPS GRIZEL IN COMMUTER RACE

Hold on there Leo Grizel, Walter Gage has almost doubled that commuter record you would like to claim.

Nortronics' Mr. Grizel has commuted 196,000 in working for Northrop and thought it might be a record.

Now comes Walt Gage, Northrop Credit Union's popular treasurer, who's logged 384,700 miles. He did it with seven cars over 25 years, driving to Hawthorne from: Pacific Palisades, three years; Northridge, six years; and Malibu, 16 years.

Can anyone top that?

TWO HAPPY FELLOWS — Members of Nortronics (Hawthorne) sponsored Junior Achievement firm, called Arbeit, were recent guests for special tour and luncheon. Group visited Hawthorne facility, then traveled to Palos Verdes for luncheon. Part of festivities was presentation of charter (above) to firm President Jeff Zizzi by Elmer Noonan, Nortronics director of Industrial Relations.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 6 | May 5, 1965

JONES URGES FULL NORTHROP SUPPORT OF 1965 FREEDOM BOND CAMPAIGN

Northrop will participate in the 1965 Freedom Bond campaign, sponsored by the U.S. Treasury Department and private industry, it was announced this week by President and Chairman Thomas V. Jones.

The coast-to-coast drive, which emphasizes payroll savings by employees of industrial firms, has as its national goal this year the enrollment of 1.1 million savers.

In a message to all personnel at all divisions, Mr. Jones said:

"Our largest customer, the United States Government, through the Treasury Department, has asked Northrop to support this year's Freedom Bond campaign through payroll deduction and I have assured them that we would do so.

"In addition to the fact that this is an important request from our customer, I regard our participation as a patriotic duty and one which we should support wholeheartedly. Moreover, each of us should have a plan for establishing a regular savings program. I know of no better way to do this than through investment in bonds of our government.

"Northrop has a nation-wide reputation for having achieved the highest participation in our industry with 99.6% of our people subscribing to savings bonds. I hope that all of you will make every effort to help us maintain this high standard."

Richard R. Nolan Appointed Senior Vice President

MR. NOLAN

Richard R. Nolan, who came to Northrop more than 25 years ago as one of its first employees, has been elevated to the post of senior vice president, Manufacturing and Administration, of Northrop Corporation, it was announced today by Thomas V. Jones, president and chairman.

Mr. Nolan has been Corporate vice president for Manufacturing and Administration since January 1965. This post is being raised to the level of senior vice president because of the importance of the functions it embraces.

Mr. Nolan was vice president and general manager of Northrop's Norair Division for six years during which time the T-38 and F-5 airplane programs were built up, meeting all goals of performance, schedule, and cost. Under his leadership, the Division gained broad recognition for its many achievements in the management of technical and production activities in the aerospace field. In mid-1964, he was assigned broader responsibilities at corporate headquarters.

"Since coming into the corporate headquarters in mid-1964, Mr. Nolan has made an invaluable contribution to the top management of the company," Mr. Jones said in announcing Mr.

(See NOLAN, page 6)

Deadline is Near For Vegas Golfers

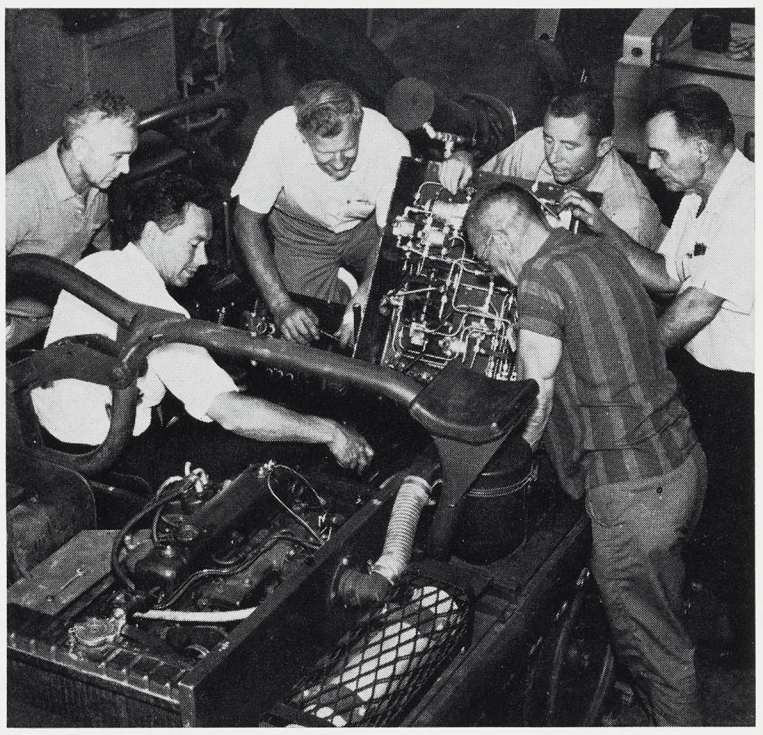
"Last call for Las Vegas . . ."

This was the word this week for Norair and Nortronics golfers interested in an all-in-one weekend excursion May 22. Deadline for reservations is Friday.

The price is $37.50 for golfers, $27.50 for non-golfers. Included is lodging (The Dunes Hotel), green and prize fees, use of an electric cart, dinner, show and a special awards party.

(Other Sports on page 6)

Nortronics Display System To Plot Missile, Space Shots



HAWKERS—Doug Cooke (in seat) points out areas of modification in Hawk missile loader to members of original builders (clockwise from left) Norris Smith, Willie Lavoie, Henry Leis, Pete Matthews, and Floyd Carey (see story at bottom of page).

Six Projectors Give Real Time Display in Color

All future space missions will be displayed for real - time analysis on a large screen, multi-color system now being installed by Nortronics Division at NASA's Goddard Spaceflight Center in Greenbelt, Maryland. Nortronics is working on the system under contract to International Business Machine's Data Systems Division, Kingston, New York.

The dynamic projection system, which is expected to be operational for analysis of the Gemini/Titan IV manned mission in early June, will pilot spacecraft movement from launch through orbit and reentry, NASA announced last week.

Mr. Chiles

Six Nortronics Vigicon projectors will be used. A reference projector with prepared background slides, as well as plotting units, are included in the system.

The unit at Goddard will be similar to one recently installed at Cape Kennedy in the Air Force Eastern Test Range Control Center, according to Ross Chiles, chief of Data Display Systems at Palos Verdes.

The display system at Cape Kennedy, operational for the first time in March for Gemini III, is

(See VIGICON, page 6)

Hawk Loader Modification Under Way at Anaheim

Northrop Nortronics (Anaheim) continues to gain momentum this month on a new Hawk weapon system modification program.

Nortronics is prime contractor in this effort, working for the U.S. Army Tank - Automotive Center, Detroit. Contract administration is provided by the Army's Los Angeles Procurement District.

Objective of the current effort is to remanufacture and update the Hawk loaders to the very latest Hawk configuration called the "E-3."

Loaders arriving at Nortronics are immediately disassembled then phased through modification lines manned by crews working under Foreman Jack Lantow and reporting to Superintendent Nick Niccole. At each point, components are either replaced by new units or reworked prior to reassembly.

Once loaders have passed through the modification program, they will be run through extensive checkout routines then returned to operational Army units in the field.

Only a limited number of loaders are out of commission at any given time, enhancing the Army's operational capability. Those returned to the field replace other loaders removed for modification.

Direction of the over-all program is provided by the Ordnance Systems section under R. T. Shaftel, program manager.

Nortronics has been a major subcontractor in the Hawk weapon system program since early 1954.

Research Group Transferred to Nortronics Div.

A new department — to be known as the Applied Research department — will be added to the Nortronics Division, according to a joint announcement by Thomas V. Jones and Frederick Stevens.

Dr. Hicks

Heading the new department will be Dr. Donald A. Hicks who has been vice president-Technical of the Ventura Division and who will become a vice president at Nortronics, reporting to Mr. Stevens.

The Applied Research department will bring capabilities in new scientific areas to Nortronics. The new department will conduct investigations in the physical sciences with special emphasis on weapons effects.

Dr. Hicks will bring with him to Nortronics a team of about 40 specialists in nuclear effects who

(See RESEARCH, page 6)

'HOMECOMING DAY'

Craftsmen's Work Withstands Test of Time

It was homecoming day.

It was a short parade, and it didn't attract much attention at Nortronics' Anaheim plant, except among a half dozen or so men who worked on the original group of Hawk missile loaders built by Northrop in 1954.

It was a rare opportunity for the veterans, who put many hours of sweat into assembling and testing the vehicles, to see how their work had stood the test of time.

After 10 years of service to the Army, the first loaders were back in the shop for modification and updating to the new Army model E-3.

"There were very few worn parts," engineer Doug Cooke said, "and the major job will be to install a new model engine, transmission and other parts to replace items no longer manufactured."

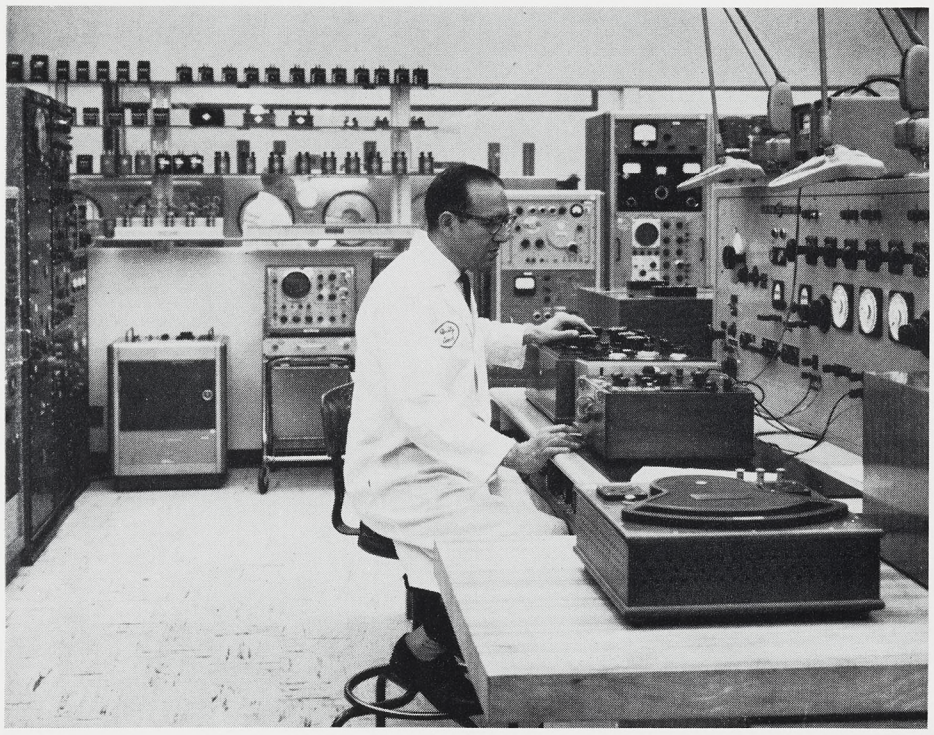
Willie Lavoie, Henry Leis, Norris Smith, and Pete Matthews, who worked on the vehicles a decade ago, were quick to satisfy their curiosity about the vehicle's durability since they saw it last.

Norris had installed insulation, suspension units and electrical harnessing. Willie's handiwork in installing parts is evident over most of the vehicle. Henry was responsible for installing hydraulics and final testing. Pete was on the superstructure and latch housing phase of assembly.

Mr. Cooke and Floyd Carey, an experimental mechanic, were also on the original Hawk loader program, but they have never been off of it as the other men have.

When assembly of the last loader was completed in 1961, Doug and Floyd kept right on going in developing and testing work of a newer model. It was their 1000 hours of testing at Yuma, Arizona, on an E-3 prototype that led to the current modification program.

Although only two loaders came in on homecoming day, there will be many more. The Army is sending them back a few at a time in order to retain as many as possible on an operational basis.



Surrounded by equipment used to certify test instruments is Phil Flores (left photo) of Norair Standards lab. Jim Bell (right) is conducting vibration test at Ventura.

StAndard, Standard, WHo's GOt tHe standaRd

Everyone on the Northrop payroll knows that each component or part that goes into a Northrop product is checked, rechecked and guaranteed.

Everyone also knows that there are hundreds of instruments throughout the Corporation which are used for checkout.

But who checks the checkout equipment? And who checks the equipment that checks the equipment that checks the equipment?

These are not common questions. But they are asked by Air Force pilots zipping through clouds at supersonic speeds with hundreds of pounds of explosives on board; they are asked by astronauts moving at 17,000 miles per hour from outer space toward a one-square-mile speck of hard, cold water; they are asked by seamen cruising below the ocean's surface with a battery of Polaris missiles and a nuclear reactor for company.

The answer is evident on the Northrop instruments used to certify their equipment. Chances are they'll find a bright red decal which includes the word "certification" and the logotype of one of Northrop's Metrology laboratories.

The decal means that a group of experts at Nortronics, Norair or Ventura divisions have once again ventured into that obscure world of infinitesimal measurement, evaluated the instrument's performance beyond the scope of everyday understanding, and issued its own brand of insurance policy backed up by the Northrop name and reputation.

Reference Standards is only one part of over-all Metrology responsibility, but it's the one that makes sure the cookie doesn't crumble and that the ball bounces the way you want it to.

The prime mover in the cosmology of measurement sciences is the National Bureau of Standards, a government agency.

Metrology's Reference Standard units are responsible for maintaining a set of standards, provided by the NBS, for use in certifying instruments which in turn are used to calibrate production and test equipment.

Sound as simple as 1, 2, 3?

Okay. How do you measure 1/10,000,000 of an inch?

How do you measure 1/100,000 of one degree Centigrade?

How do you measure 1000 volts to an accuracy of .15 parts per million?

To better cope with increasing pressure on the limits of man's and machine's capabilities, Northrop Metrology units are engaged in a vigorous program of assessing interdivisional capabilities and establishing procedures for interdivisional cooperation.

The Corporate Quality Control committee has established a Metrology working group composed of section chiefs from each division. Norair's Art Ohlemacher is chairman this year (the chairmanship is rotated annually) and members are Phil Painchaud of Nortronics (Anaheim) and Harry Vickers of Northrop Ventura.

"In order to begin a program of pooling technical skills," Mr. Ohlemacher said, "there was a great deal of administrative groundwork to be laid.

"Many sessions were devoted to just finding out how we could help each other. From the long list we developed, we have to date put into effect such things as exchanging lists of reference standards equipment; standardization of major definitions, terminology, decals, and definitions of implementation; establishment of divisional responsibilities for maintaining reference standards, and many more."

Considerable savings to the Corporation have been recorded from assigning responsibility for certain standards to each division rather than each division maintaining capabilities in all areas.

Assignments are traced to product lines as much as possible.

A blanket interdivisional work order has been set up to enable each division to perform work for the others.

At Anaheim, Nortronics Metrology has a going commercial business in standards and calibration with a couple dozen paying customers in related fields. Services provided by Mr. Painchaud's group include instrument calibration repair and procedure writing.

Nortronics' capabilities in pushing Reddi Kilowatt to the state of the art have caused

(See STANDARDS, page 5)

THE CHIEFS

Harry Vickers Ventura

Art Ohlemacher Norair

Phil Painchaud Nortronics

Bookcase in Norair Metrology lab contains instrument manufacturer's manuals. This is only about one-fourth of voluminous literature which must be maintained by metrologists.

Nortronics (Anaheim) cuts cost, makes more equipment available with common pool of test equipment. Vito DePaul (photo at left) checks out one of nearly 4000 pieces now in stock. Metrologists view of metrologists (right) is depicted by Harold Leff in former publication, "Metrology News and Notes," at Anaheim.

"I'm reassigning you Cranston, You've been reading meters long enough."

Gemini IV Pilots Fitted For Chutes

America's second team of Gemini astronauts, scheduled for two days of orbital flight early in June, last week received a final fitting of their personal parachute harnesses by Northrop Ventura.

Astronauts James A. McDivitt and Edward H. White were fitted by Northrop Paradynamics Test Engineer Lew Vinson at Weber Aircraft Company in Burbank, where Gemini emergency ejection seats are built.

At Weber the astronauts were up to their neck in moist sand, which hardened to provide a cast for building tailor-made seats and back supports.

In addition to the main parachute landing system, Ventura Division developed the escape system parachutes. The harnesses are worn like a jacket and are tailor made.

The two astronauts were fitted earlier at the Newbury Park plant of Ventura Division, but modifications to their pressure suits, as well as seat cushions, necessitated a final fitting.

Astronauts James Lovell and Frank Borman, back up pilots to Mr. McDivitt and Mr. White, also received seat and parachute harness fittings last week.

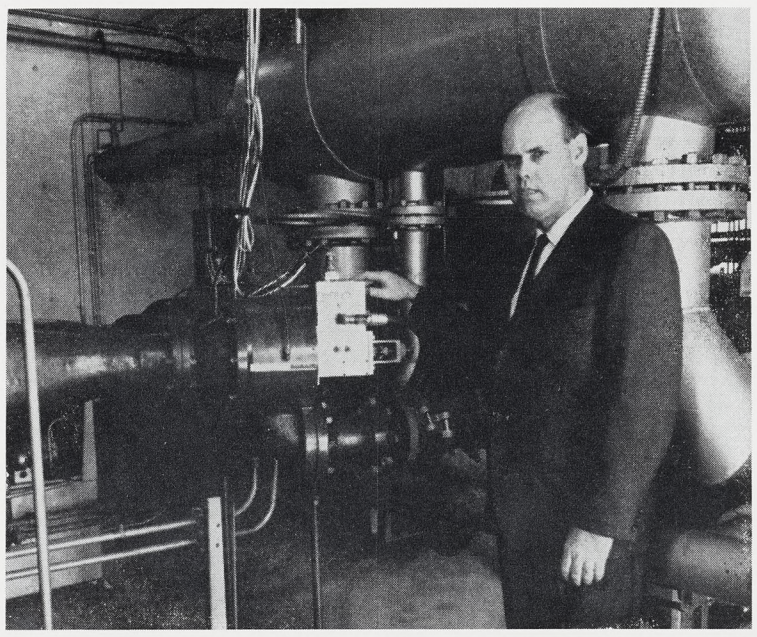
Art Club Slates Exhibit, Art Film

Nortronics (Anaheim) Art Club Commissioner Ed Mosher has announced an interesting "Carnevale de Art to be held at 7:30 p.m. May 22 in the NRC Clubhouse, 1834 Valencia Drive, Fullerton.

Art Club members will display their work and the work of children artists will also be shown. An hour-long sound film on the making of the movie "Lust for Life" will be presented and refreshments served.

Some of the exhibited material will be donated for door prize drawings.

There is a $1 donation charge for adults with children admitted free.



POWER IN A SMALL PACKAGE—Norair Division's Don Skilling, an acoustics specialist involved in long line of Norair sound generating developments, stands beside Northrop Mark VIII unit installed in North American Aviation, Inc. reverberating test chamber. Mark VIII can produce 400,000 acoustic watts, is most powerful system of its type known to free world, and is currently in use on Apollo lunar orbital spacecraft tests.

Biggest Noisemaker In World Perfected

Northrop Norair, world leader in the development of sound generating systems, has perfected the most powerful acoustic generator known to the free world. Latest in a series of generators produced at Norair, the Noraircoustic Generator Mark VIII, is capable of developing 400,000 acoustic watts or six times as many as the next most powerful system known. It produces sound pressures which are more than a million times greater than normal office levels.

Mark VIII is currently in test use at North American Aviation, Inc., Los Angeles Division, on the Apollo program.

Apollo is the manned lunar orbital spacecraft which will conduct moon explorations. It will be launched by the Saturn V booster.

Scientists are currently conducting extensive tests to determine if these potentially damaging noise levels will adversely affect critical spacecraft systems or their operating personnel. Fatigue properties of structures, components and materials are being laboratory tested in advance to discover and minimize potential failures prior to launch.

WHAT'S WATT

The term acoustic watts may be misleading to some.

Here is an example of the power involved:

An ordinary home hi-fi set played sufficiently loud to warrant neighbor complaints would generate approximately one acoustic watt.

Random noise levels produced by the Mark VIII simulate the sound environment encountered under actual rocket launch conditions. Discrete frequency sound energy (tones as opposed to random noise) can also be produced by Mark VIII to determine the precise level at which test subjects undergo damage.

Northrop is recognized as a world leader in the field of developing and manufacturing acoustic generators for its own test facilities as well as those of outside users.

Initial work in this field dates back to 1955 when Norair began developments for use in such missile programs as the Snark as well as all-around general laboratory use.

Norair's Mark I system was employed in very early development stages on the T-38 supersonic trainer program. In succession came the Mark II and Mark III and finally the Mark IV which is still in use at Norair. The Northrop Mark V was turned out for such users as Boeing, Lockheed and NASA who continue to utilize the system. The Mark V was a development step leading to the Mark VII, two of which were delivered to North American as the Mark VIII assembly.

Norair operates its own progressive wave and reverberation test chambers for random sound source development.

Development and actual production of the world-famed Northrop sound sources has centered in the Norair Environmental Laboratory, a part of the Engineering Test Laboratories group headed by R. B. Jackman, chief.

Developmental work has found Don Skilling, Paul Finwall, Don Burke and V. L. Cole, supervisor, in key roles. Harold Spivey, an acoustic facility technician, has handled special assignments along with various functions of Engineering Test Laboratories where components were turned out.

RECRUITERS DUE

Leaves Offered Peace Corpsmen

A 25-month leave of absence will be granted successful applicants for the Peace Corps, it was announced this week by Industrial Relations. In response to a request by Peace Corps Director Sargent Shriver, Northrop will cooperate with the Corps in an in-plant recruiting program later this month.

Employees interested in joining the Peace Corps should fill out the form below and send it to their appropriate Division Industrial Relations office before May 12. A schedule of interviews will be arranged with Peace Corps representatives and each applicant will be contacted individually as to day and time.

Leaves of absence will be granted under the same provisions of the policy presently in effect for persons elected to public office, an Industrial Relations spokesman said.

That policy, which is included in the manual "Working With Northrop," provides for leaves of absence without pay. During such leaves, seniority is retained but not accumulated.

Although Peace Corps tours are for 24 months, Northrop will allow an extra month for returning volunteers to get settled.

As for the Corps itself, it is enjoying immeasurable success after three years of establishing itself as a significant tool for motivating self-help in emerging nations.

More than 12,000 volunteers have served or are serving in Asia, Africa and Latin America.

Since the announcement last month by Northrop President and Chairman Thomas V. Jones that the Corporation would "take every practical step in support of the fine work which the Peace Corps is doing," the NORTHROP NEWS has collected answers from the Peace Corps to the most frequently asked questions about Peace Corps service.

WHO MAY APPLY? Any United States citizen over 18 years, provided he has no dependent children under 18. Married couples without dependents under 18 may apply if both can serve. There is no upper age limit, and Northrop retirees may apply.

IS A COLLEGE DEGREE REQUIRED? No. Neither is a high school diploma.

WHAT SKILLS ARE REQUIRED? Developing nations are in need of practical instruction in mechanical, manual and general administrative skills. An average housewife's skills in clerical work, sewing, food preparation, and health practices are important also.

IS THERE ANY SPECIAL TRAINING REQUIRED? If accepted by the Corps, an applicant will be invited to a three to four month training course in the United States. Courses include language training, studies about nations abroad and a refresher class in American history.

WHAT ABOUT LIVING CONDITIONS? These, of course, vary with the area of assignment, but the Peace Corps states that the 10,000 volunteers now in 46 countries live in moderate, but adequate conditions. A Peace Corps doctor is a full-time staff member.

IS THERE ANY PAY OR ALLOWANCES? All expenses—including travel, food, clothing, medical care, and incidentals—are paid by the Corps. Upon completion of two years service, a volunteer will receive $1800, which is taxable, and a married couple will receive $3600.

I am interested in being scheduled for an interview with Peace Corps representatives.

Name..... Employee No.....

Dept. No. and Location..... Shift.....

Plant or Bldg. No.....

Home Address.....
(Street) (City)

(Please return to Industrial Relations department.)

Symposium Tabs Miller, DiJulio

Ross Miller, Nortronics vice president and manager of the Technical department, will serve as technical sessions director for the 23rd annual Space Electronics Symposium, scheduled for May 25 through May 27 at the International Hotel, Los Angeles.

Mr. Miller is responsible for the symposium's entire technical program. The meeting is sponsored by the Aerospace Electrical Society and American Astronautical Society.

Roger M. DiJulio of Nortronics is serving as assistant technical sessions director.

DORSEY, SINATRA JR. BOOKED FOR 'NORTHROPLAND' NIGHT

Disneyland will become "Northropland" between 7:30 p.m. and 12:30 a.m., Friday, May 28.

That's when all facilities at the world-famed funland will be reserved exclusively for Northrop families for a very special price through the joint sponsorship of Northrop Recreation Clubs.

BELTING OUT — song like his father before him, Frank Sinatra jr. sings before Disneyland crowd. Frank, Pied Pipers and Tommy Dorsey orchestra will entertain for Northrop Night, May 28.

The cost is $3.75 per person.

Before 7:30 p.m. on the eve of the long Memorial Day holiday period, the general public will be cleared from Disneyland. All facilities then will be available until closing time to Northrop employees without further charge, except for concessions and rifle and pistol ranges.

Free entertainment includes dancing to the Tommy Dorsey orchestra and admission to the famed Tiki Room. Frank Sinatra, jr. and the Pied Pipers will also perform.

Tickets are currently on sale through all Northrop Personnel Activities offices and other ticket outlets.

Last year 9500 members of the Northrop "family" took part. This year larger crowds are anticipated, so early purchase of available tickets is being advised by sponsoring NRC groups.

Ballroom Dancing Lessons Offered

A rare opportunity for all Northrop employees, their friends and families to learn the latest in social or ballroom dancing is being offered through NRC sponsorship.

Special 10-week courses, with one class per week each, open tomorrow night at NRC Clubhouse, Hawthorne. The cost is a nominal $5 per person for each dance studied.

Sessions at 7:30 p.m. will feature beginning rhumba; at 8:45 p.m., advanced cha cha; and at 10 p.m., beginning foxtrot.

Eight Northrop Scholarships Go to Merit Exam Winners

National Merit Scholarship Corporation last Wednesday announced that there were eight winners of the Northrop Corporation Merit Scholarship for 1965. This concluded the 10th annual merit scholarship competition with over 1900 outstanding students—largest number in the history of the nationwide program — named winners of four-year awards to the colleges of their choice.

The Northrop winners, seven young men and one young lady, all high school seniors this year were selected on the basis of competitive exams given in March and December of last year.

As children of Northrop employees they represent the Norair and Ventura Divisions, Nortronics east and west coast facilities, and Page Communications Engineers, Inc.

This year's allocation of scholarships is the largest since Northrop Corporation started participating in the program in 1959. Previously the largest number awarded in one year was two. There are presently seven Northrop scholars attending schools throughout the country.

The current group of Northrop merit scholars are:

—Lance Bertelsen, son of Niels Bertelsen of Nortronics (Palos Verdes) and a student at Hawthorne High School. Lance plans to major in English at Dartmouth College and plans a career as a lawyer.

—Douglas Alan Cook, son of Bert M. Cook of Norair and a student at North High School, Torrance. Douglas intends to enroll at Stanford University to study civil engineering.

—Alice Loraine Cordell, daughter of Ventura Division's Edward L. Cordell and a student at Oxnard High School. Alice is undecided as to a career but wants to major in math or science at Antioch College.

—Robert William Dedon, son of William S. Dedon of Ventura Division and a student at Palisades High School, Los Angeles. Bob intends to major in business administration at UCLA.

—Paul Mills Glassco, son of Donald E. G. Glassco of Norair and a student at Temple City High School. Paul plans to enroll at Harvey Mudd College to major in mathematics and would like a career in research mathematics.

—Nicholas David Humez, son of David E. Humez of Nortronics' Precision Products Division at Norwood, Massachusetts, and a student at Lexington (Mass.) Senior High School. He has his sights on Harvard University where he wants to study French literature.

—Robert Patrick McMahon, son of John H. McMahon of Page Communications and a student at Bishop Denis J. O'Connell High School, Falls Church, Virginia. Bob intends to major in mathematics at the University of Virginia.

—Gary James Turnbull, son of Charles R. Turnbull of Nortronics (Anaheim) and a student at Valencia High School, Placentia. Gary plans to major in International Relations at Michigan State University, with a Foreign Service career in mind.

The National Merit Scholarships sponsored annually by Northrop are part of an extensive Aid to Higher Education program, which also includes restricted and unrestricted grants to various U.S. universities.

NEW EYES

Huge stack of eyeglass frames, cases, etc. are packaged for shipment to New Eyes for the Needy, Inc., a charitable group that makes them available to the needy around the world. In-plant contributions, plus obsolete safety glasses, added up to 1500 pairs for this effort. Maurice Young (left) and John Musulin prepare to box shipment.

Lauren Named Ad Manager

Ward Lauren has been named Northrop's advertising manager, it has been announced by Norman Warren, Corporate director of Public Relations and Advertising.

A public relations and advertising writer in the Los Angeles area for the past 15 years, Mr. Lauren has been with Northrop for two and one-half years. He was with the company briefly in 1952, followed by 10 years in Public Relations and Advertising at North American Aviation, Inc.

Doyle Dane Bernbach is Northrop's advertising agency.

LONG WEEKEND DUE IN MAY

First "long weekend" holiday period of the new year is just around the corner for all Northrop employees.

Memorial Day this year falls on Sunday, May 30. Thus, Northrop facilities will suspend operations Monday, May 31, giving employees a three-day holiday period.

Scenic Flights To Raise Funds For Boy Scouts

Scenic flights over Los Angeles aboard propjet airliners are being offered all Northrop employees May 15 and 22 in the second annual "Operation Scoutflight."

The name stems from the $5 per person fee which goes to support Los Angeles Boy Scout programs.

The 20-minute flight, departing each day at 3, 3:30 and 4 p.m., will carry passengers over Catalina Island, Long Beach, San Fernando Valley and downtown Los Angeles. Special arrangements will be made for camera fans.

Participants will also see the Northrop F-5 firepower film and the North American B-70 first flight film while waiting departures.

Departures will be from Los Angeles International Airport aboard Pacific Southwest Airlines Electra-Jets.

Tickets are now available through Personnel Activities office at Norair, ext. 2486.

DISASTER AID

Shortly after major disasters the United States Treasury moves swiftly to offer cashing facilities and replacement of bonds lost by fire, flood or other catastrophe.

Arata Given AIAA Nod For L.A. Post

W. H. Arata of the Corporate Marketing staff has been nominated chairman of the Los Angeles section of American Institute of Aeronautics and Astronautics for 1965-66.

Mr. Arata is currently vice chairman—Meetings.

He heads a full slate of candidates proposed last month by the Nominating committee, which includes: J. E. Froehlich of Space General Corporation, chairman; P. A. Colman of Lockheed Aircraft Corporation, H. D. Moran of Batelle Memorial Institute, E. J. Specht of General Electric Corporation, and M. A. Sulking of North American Aviation.

William J. Oakes, Northrop Space Laboratories, is secretary of the Los Angeles section.

In other AIAA news, representatives of Norair and Nortronics divisions and NSL presented key papers last month.

Norair's Sid Thurston, chief of Advanced Underwater Systems, and R. D. Jones, a former Nortronics (Anaheim) senior engineer, described in the Journal of Aircraft a soluble coating which can be applied to the surface of an underwater body to reduce friction drag.

At a conference on Support for Manned Flight at Dayton, Ohio, NSL's Dr. E. O. A. Naumann, assistant manager of the Systems department, presented a paper on lunar surface vehicles. Co-authors of the paper were Eugene Smith and Bill Sponsler, both members of the Advanced Systems section at NSL.

The three-day conference, sponsored by AIAA, was April 21-23.

AIR SPACE FILLING UP FAST FOR NRC EUROPEAN TOUR

Although the departure date is still five months away, more than one-half of the available space on the European tour sponsored jointly by NRC Travel Clubs is taken.

The tour dates are October 20 through November 7. Transportation to Europe will be via Air France jet over the Polar route.

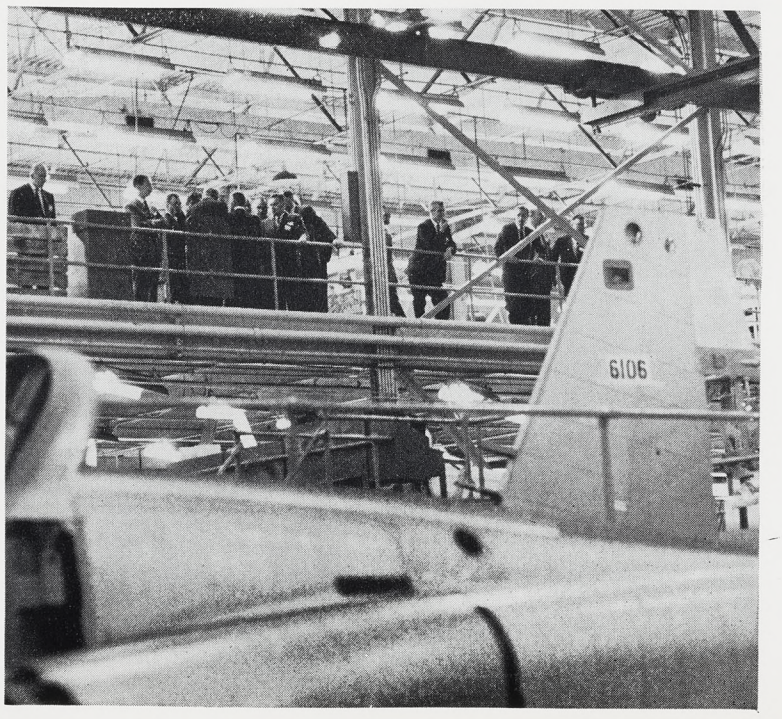
On May 19 (8 p.m.) those signed up, plus interested parties, will gather at the NRC Clubhouse, Hawthorne, for a briefing and general information session.

There are three possibilities open to the traveler. First, round trip air fare only, which is $315. Once in Europe three options are available: a tour through England, Switzerland, Holland, Austria, Belgium, Italy, Germany and France; and, a tour touching England, Sweden, Holland, Denmark, Germany, France and Norway.

Land tours for the two above are an additional $298. Third option is a visit to England, Portugal, Spain and France, with the cost an additional $420.

All Northrop Personnel Activities offices are accepting reservations, with a deadline for the trip of August 1.

One Group of NATO Officers Checks in at Palos Verdes (left), While Later Group Sees F-5 Assembled at Hawthorne (right)



STANDARDS: Capabilities Increase With Demands

(Continued from page 2)

even manufacturers to walk away in awe of their own equipment's performance when linked up to other equipment used by the Anaheim group.

Mr. Vickers at Northrop Ventura pointed that the job is made even more complex by the fact that Metrology technicians, in calibrating test equipment, must use a criteria four to ten times more accurate than the test equipment being calibrated.

"Everytime we put one of our calibration decals on an instrument we are guaranteeing that the instrument will perform to operating requirements. We had better be right," he added.

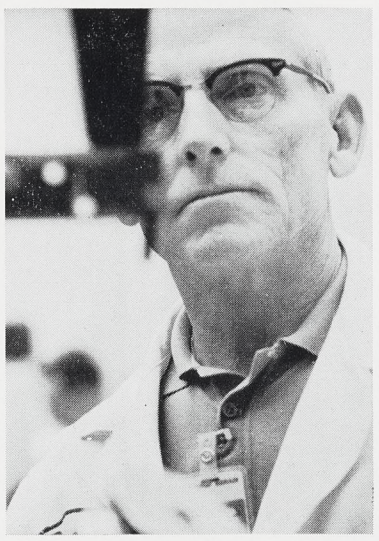
While the current effort toward interdivisional cooperation is directly related to backing up those "certified" decals, its implementation is having a much broader effect on the labs.

Their organization has been standardized into four major functions.

Metrology Engineering provides technical support to both the calibration and standards labs and provides advisory support to other technical departments in each division.

Calibration and Maintenance is responsible for initial "tuning up" of instruments and maintenance throughout the life of the piece.

Milo Thomas of Ventura Division tunes in to National Bureau of Standards radio station WWV, which broadcasts a continuous signal from Boulder, Colorado, to provide metrologists a standard for frequency.



This is instrument's-eye view of metrologist. In this case, it's Norair's Jim Norton peering at arm of scale.

Administration and Equipment Control keeps a record of each piece of equipment calibrated by the lab and establishes a recall schedule for regular maintenance.

It is a never-ending job of establishing standards, implementing them and maintaining the equipment which uses them. The job started nearly 3000 years before the birth of Christ when an Egyptian engineer, working on the great pyramid of Gizeh, stretched out his arm, pointed to the area between his elbow and tip of his fingers, and said in effect:

"This is a cubit. You will use this measurement to make all the pyramid's stones uniform."

That's all it took to establish the first reference standard.

The tomb, which is 481 feet high and 756 feet on each side has been found accurate to 0.6 inch.

It was an amazing engineering feat, but it's a long way from 0.0000006.

Ice Show Special Night a Sellout

While all tickets to the "Northrop Night at the Ice Capades" tonight have been sold, employees may still attend subsequent performances at reduced rates, thanks to Northrop Recreation Club.

Personnel Activities offices and regular ticket outlets throughout Northrop have special discount coupons which may be exchanged for regular tickets at Ice Capades sales offices. They are good for $1 per ticket discount.

NORTHROP NEWS

Vol. 23 No. 6

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:20 a.m. — 4:05 p.m.

Vermont & El Segundo Blvd., Gardena. Joanne L. Irwin, ext. 4075 or 4076, 321-6391.

7:30 a.m. — 4:15 p.m.

La Brea Ave. & Hyde Park Blvd., Inglewood. Colleen Conner, ext. 1972. 3

8 a.m. — 4:45 p.m.

Ventura Fwy. & Topanga Cyn. Blvd., Canoga Pk. John Dennis, ext. 1708, 1969, 340-8274. 5

Bellflower Blvd. Exit Ramp, San Diego Fwy., Long Beach. Don Beastrom, ext. 2264, 425-9781. 5

Balboa or San Diego Fwy. & San Fernando Blvd., Granada Hills. Francis A. Morse, ext. 4221, EM 3-2933. 5

Tampa & Winnetka, Woodland Hills. Olive B. Daley, ext. 1412, 340-3765. 5

Rides Offered

8 a.m. — 4:45 p.m.

Ventura Fwy. & Topanga Cyn. Blvd., Canoga Pk. John Dennis, ext. 1708, 1969, 340-8274. 15

Bellflower Blvd. Exit Ramp, San Diego Fwy., Long Beach. Don Beastrom, ext. 2264, 425-9781. 15

Balboa or San Diego Fwy. & San Fernando Blvd., Granada Hills. Francis A. Morse, ext. 4221, EM 3-2933. 15

Tampa & Winnetka, Woodland Hills. Olive B. Daley, ext. 1412, 340-3765. 15

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Motorcycle, 1962 Norton, 750 cc, 1963 eng., $450. No. Hollywood, PO 3-0386. A

Stove, 1963 GE automatic, elec., $100. Redondo Bch., 378-1038. A

Refrigerator, International Harvester, 9 cu. ft., freezer across top, $75. Rolling Hills, FR 7-1094. A

Guitar, 6-string, $45. Manhattan Bch., FR 2-3860. A

MG Midget, 1962 rds., r/h, 11,000 act. miles, hard top, many other extras, $1195. Venice, EX 6-3594. A

Chevrolet Malibu S/S, 1965, big eng., 4-spd., r/h, tach, plus many extras, low mileage, $2800. Hawthorne, 676-5012. A

Photo Enlarger for 35mm, $25. Compton, NE 8-2222. A

Renault Dauphine, 1957, rebuilt eng., good for spare parts, $50. Torrance, 326-6539. A

Utility Bed for pickup truck w/fenders, $10. Torrance, 320-2827. A

Bowling Ball, Black Beauty Brunswick, 16 lb., man's r-h, $6. Norwalk, 864-7673. A

Tires, set, Allstate Guardsman, 600-15 w/w, $60. Compton, 635-3294. A

TV, Westinghouse portable w/stand, 9-mos.-old, $100. Inglewood, 677-4540. A

Dream Kitchen, child's Lux, 3 Barbie dolls, 1 Midge doll, blue case, 18 outfits, 18 new Nancy Drew books, $20. Thousand Oaks, 498-2867. A

Signal Generator, Eico 320, $19. Playa del Rey, EX 1-4860. A

Rambler American, 1959 2-dr., new paint & int., o/hauled auto. trans., $450. San Pedro, TE 3-9455. A

Encyclopedia Americana, 32 volumes including 2-vol. dictionary, plus yearbooks to date, 1943 edition, $20. Torrance, DA 4-0341. A

Hide-A-Bed, Simmons, T-cushion, white Naugahyde, $100. Manhattan Bch., FR 4-8036. A

Bed, dble., boxspring, mattress & metal frame, $45. Fullerton, 714-529-4788. A

Camera Kit, Polaroid 900, color, $70. La Mirada, 941-8390. A

Piano, baby grand, walnut, $800. Anaheim, 828-2440. A

Dodge, 1957, 4-dr. h/top, p/b, r/h, new eng. & trans., 4 chrome reversible rims, $450. L.A. 44, 755-9071. A

Shoes, brown lustre-calf, 9S, high heel, open back, closed toe, $8.50. Downey, 923-8532. A

Buick, 1954 super sedan, orig. owner, $300. Inglewood, OR 2-1809. A

VW camper, 1962, w/butane stove, ice box, $1200. Hawthorne, 675-9068. A

Lawnmower, Craftsman Delux, 18", $20. Buena Park, TA 8-0746. A

Boat, outboard, 15', Carter Craft, convertible top, fully equipped including water skis, 70 hp Mercury eng. w/elec. starter, trailer w/winch, $995. Lakewood, TO 7-0832. A

Utility Shed, wooden, 4'x8'x8', $50. Buena Park, 527-1201. A

Chevrolet Impala, 1962, r/h, good tires, 4-dr. h/top, $1545. Mar Vista, EX 7-4732. A

Galaxie 500XL, 1964, b/seats, air cond., p/s, p/b, plus many extras, 13,000 miles, $2750. Inglewood, 754-8261. A

Sailboat, 25' yawl, 22½ hp Grey-Marine auxiliary, SS rigging & dinghy, $2500. Long Bch, 438-5579. A

Pontiac Bonneville, 1961, auto. trans., p/b, p/s, $1650. Inglewood, OR 3-1913. A

Corvair Monza, 1962, 4-dr., b/seats, r/h, 102 hp eng., 1 owner, $1095. Alhambra, AT 4-5698. A

Triumph conv. Herald, 1961, 29,000 miles, w/w, r/h, $500. Whittier, 696-5082. A

Hair Dryer, lge., for professional use, all chrome, on stand w/casters, 4 position switch, $25. Torrance, FR 5-4047. A

Factory Service instruction manual for Triumph TR 2 & 3, $10. Rolling Hills Est., 375-7038. A

Oldsmobile 88, 1959, 4-dr. sedan, 1 owner, $650. Torrance, 325-1243. A

House Trailer, Spartan, 35', 1952, tub & shower, natural gas or butane heater, washer & hot water heater, dble. bed, $995. Redondo Bch., FR 6-6415. A

Mercury Comet, 1963, 2-dr., custom model, take over $54 mo. payments, bal. $1700. Inglewood, 672-8830. A

VW sedan, 1959, new w/w tires, Becker radio, elec. clock, orig. owner, $875. Torrance, 323-0180. A

Bing Surfboard, 9 ft. 7 ins. long, 4 stringers, $90. Encino, 987-2047. A

Accordion, 120-bass, $125. Gardena, DA 4-0158. A

Ford F100 pickup, V8, 1960, heater, 6-ply truck tires, w/Cab-O-Tel camper, $1250. Torrance, FR 5-8474. A

For Sale

Cad. Coupe De Ville, 1958, low miles, all power, premium tires, new air cond., perfect mechanically, $1095. L.A. 34, GR 3-9897. A

Chrome Rims, set, 14", w/baby moons, 2 cheater slicks & tires, fits Pontiac or Oldsmobile, $100. Inglewood, OS 3-5568. A

Cadillac, 1941, 4-dr. sedan, 1948 eng. & Hydromatic, $100. Torrance, DA 3-2273. A

Mobile Home, 1964 Universal, 12'x55', 1-bdrm., furn., 8' expansion, porch & awning, $8500 or $1500 down & take over pymts. Anaheim, 772-5754. A

Volkswagen, 1964, 1500-S Variant, Safari biege, shoulder harness, 66 hp, $2195. Rolling Hills Ests., 377-8155. A

Acreage, 5-acre cabin sites near Willow Springs, $1750. Rolling Hills, 325-3057. A

Power Mower, Reo Holiday, reel-type, $25. Hawthorne, OS 9-3716. A

VW Camper, 1963, complete w/tent & stove, 1500 eng., 20,000 miles, $1750. Inglewood, OR 4-1654. A

Refrigerator, Westinghouse, $50. Hawthorne, 675-5654. A

Chassis Camper, 10½' on 1958 Chevrolet, fully equipped, duals, $2195. Lawndale, 370-2149. A

VW, 1964, r/h, 4-spd., $400 & assume $1200 balance. El Segundo, 322-4027. A

Washer & dryer, Frigidaire Imperial Deluxe, automatic, 1964 model, used less than 6 mos., $295. Santa Monica, 393-7464. A

DeSoto, 1953, 4-dr., new tires, starter, battery, coil, $200. Hawthorne, 676-3138. A

Home, 3-bdrm., pool, 2-bath, serv. porch, 2-car gar., 15x31 covered patio, landscaped, $2000 dn., $24,750. Whittier, 943-2600. A

Magazine, Model Railroader, 49 issues, May 1943 - Apri. 1952 & 10 other books, $15. Los Alamitos, GE 1-4233. A

T-Bird, 1955, stick, r/h, hard & soft top, new eng. & trans., $1350. Hollywood. 656-3475. A

Corvair, 1961 station wagon, w/w tires, r/h, auto. trans., $875. Torrance, FR 8-0895. A

House, 3-bdrm., 2-bath, family rm., landscaped, $1800, 6¼% first, $24,400. Thousand Oaks, 495-5092. A

Chevrolet, 1955, stick, r/h, new paint, $400. Redondo Bch., 372-9323. A

Drill motor, ½" HD Sioux w/stand & several drills, $55. L.A., PL 4-0817. A

Tool Box, 18" Gerstner tool & die makers tools, 1964 Starrett, $150. Inglewood, PL 4-7859. A

Bicycle, boy's 10-spd. Derailleur, $25. Inglewood, PL 5-4497. A

TV, 1963 23" Zenith, walnut cabinet w/remote controls, $100. Hawthorne, OS 5-7938.

Chevy II, 1962, 2-dr., factory air cond., r/h, low mileage, $1495. Sherman Oaks, ST 8-9709. A

Pups, AKC miniature Dachshund, 7-wks.-old, $50 females, $55 males. Torrance, FR 5-1660. A

Typewriter, Underwood standard, $65. Hawthorne, OS 6-1085. A

Falcon, 1960, 4-dr. sed., auto. trans., r/h, w/w, tires, $575. Torrance, DA 5-3724. A

Dining Room set, cherry wood, 6 chairs, glassdoor hutch, 2 extra leaves, pads, $90. L.A. 64, GR 3-3168. A

Shotgun, Remington 16 ga. auto., model 11, recoil pad, case, Cutts comp., adj. tube w/2 tubes, $100. L.A. 5, 384-4017. A

Gages, micrometer set, Starrett & Lufkin, various sizes & numbers, $40. Inglewood, OS 6-0049. A

Ham equip., Heath DX-35 75-watt, phone - CW transmitter w/Heath VFO, Astatic JT-30 microphone, $40. Hawthorne, 675-5802. A

Drapes, tan, Don Loper material, 80" length for 25' window span, includes valance, $65. Torrance, FR 5-2127. A

Chevrolet sedan, 1956, Powerglide, $400. Long Bch., GA 3-1363. A

Trailer, utility-type, 4' x 6', lights, removable top, good tires, $65. Hawthorne, OS 9-3978. A

Drums, complete set, Ludwig, $350. Moorpark, 805-529-1285. A

Refrigerator, Hot Point, cross-top freezer, 2-door, $99. Inglewood, 675-0788. A

House, 2-bdrm., stucco, R3 lot, lge. enc. yard, gar., 10% down, no finance charges, $13,500. San Pedro, TE 3-2512. A

Camera, Polaroid, elec. eye, model J-66, leather case, 2-yrs.-old, $75. Hawthorne, OS 9-6334. A

Ford Country Sedan, 9-pass., 1960, low mileage, 1 owner, $950. Inglewood, 755-1071. A

Television, Magnavox, 23", light walnut cabinet, $75. Gardena, 757-2383. A

Lincoln, 1954, auto. trans., p/s, elec. windows, r/h, $50. San Pedro, 547-3490. A

MGA 1600, 1960, r/h, h/top, good tires, $1025. Box 601. A

Encyclopaedia Britannica, deluxe edition, $15 & take over payments of $13 mo. Palos Verdes Est. FR 5-5097. A

Mobile Home, 12x57', 1962, Riviera w/porch, alum. awnings, screen room. $5300. Long Bch., 428-1789. A

Plymouth Belvedere, 1955, 2-dr., sedan, r/h, auto. trans., 1 owner, $150. Torrance, FA 8-6839. A

Boat, 14' Morgancraft, glassed-plywood, 12 hp motor, remote controls, trailer, $300. Torrance, 834-2845. A

Adding Machine, Odhner, automatic, $80. Sherman Oaks, 789-4635. A

For Sale

Swift, 1947, 125 hp, hvy. case, eng., 1315 hrs. on airframe, 1010 hrs. on eng., $2500. L.A., 398-2104. A

Trundle Beds, hard rock maple, box springs & mattresses, $80. Torrance, DA 9-6174. A

Ice Box, 18"x24"x48", $10. Torrance, FA 8-3306. A

Wanted to Buy

Motorcycle, scrambler-type, 150 cc & up. Lomita, 325-0341. B

Range & refrigerator, apt.-size, elec., low price. San Pedro, TE 1-6462. B

Sewing Machine, power, suitable for upholstery & canvas. Redondo, FR 4-2915. B

For Trade

Chevrolet pickup, 1956, auto. trans., trade for small foreign or sports car. Torrance, FA 8-7076. C

FREE (To Be Given Away)

Wood Fence, 40 feet, unpainted, about 10 yrs. old, must be cut in order to be taken away. Inglewood, 672-5578. D

Kittens, half Siamese. Anaheim, 714-776-8785.

Tropical Fish, fancy guppies, sword tails, & platies. Torrance, 320-5120. D

Laundry Tub & stand. L.A. 43, 295-9997. D

Rentals Offered

Unit, owner's, 1800 sq. ft., 3-bdrm., 3-bath, family rm., fireplace, pvt. deck & 3-car subterranean gar. w/storage, built-in kitchen, soft water system, adults, $275 lease. Redondo Bch., 373-1143, 673-3298. E

Studio Apt., unf., owner's unit, pvt. patio, closed gar., 3-bdrm., $165 mo. 1-bdrm, $95 mo., Torrance, FR 5-0867. E

House, 2-bdrm., 1½ bath, dishwasher, disp., gar., utilities pd., in No. Redondo, $150 mo. Portuguese Bend, FR 7-1734. E

House, 3-bdrm., newly decorated, fenced, $145 mo. Gardena, FR 5-7658. E

Studio Duplex, 2-bdrm., 1½ bath, trash & water paid, $125 mo. Redondo Bch., 374-0251. E

Duplex, 1 story, on bus line, children & pets o.k., range & refrigerator avail., fenced yd., $60. unfurn., $70 furn. Lawndale, 675-9389.

House, 2-bdrm., furn., lge. fenced yard, $135 mo. Huntington Pk., 589-9503. E

Apt., 2-bdrm., furn., pool, $135. Torrance, 323-1946. E

Cabin, Green Valley Lake, $35 weekend, $65 week. Torrance, 320-2002. E

Apt., owner's duplex, 4-bdrm., 1-yr.-old, 1¾ bath, lge. backyard, 2 blks. to school, walk to Centinela Pk., utilities pd., lease, $220 mo. Inglewood, 673-4274. E

Apt., 1-bdrm., deluxe, built-ins, pool, $90. mo. Redondo Bch., 376-2117. E

Apt., 1-bdrm., 1 block from Norair, furn., water & trash paid, $100 mo. Hawthorne, 675-6291. E

Apt., single, small, sleeps 3 adults or 2 adults & 2 children, completely furn., avail. thru Sept. 1, $75 wk. Catalina Island, Avalon 443. E

House, 2-bdrm., fenced yd., trash & water pd., children ok, no pets, $105. Lawndale, 371-6775. E

Duplex, 2-bdrm., nice view, yard, gar., $125. Manhattan Bch., 372-7143. E

APTS, 1-bdrm. & 2-bdrm., unfurn., deluxe, w/w carpets, closed garage, $100-$145 mo. Torrance, 371-5037. E

Rentals Wanted

Cabin, Crestline or Arrowhead area, close to lake, to sleep 5 adults & 3 children, from August 8 to 16, must have cooking facilities. Lawndale, 370-2752, Inglewood, 755-2986. F

Lost

Watch, ladies tiny gold Longines, reward, Norair Plant Protection, ext. 1972 or Gardena, DA 9-3593. J

Disneyland Tickets, 5, in Plant I parking lot Nos. 0563-0564-0565-0566. Please return to Personnel Activities. Reward, 1 free admission to Disneyland May 28. Numbers will be checked at ticket window. Torrance, 325-0496. J

Personals

Will do your typing in my home—term papers, theses, etc. Inglewood, 755-2436. L

Want to share home. Room w/pvt. bath for single women, use of full house & yard, must like pets, near Disneyland. Anaheim, KE 5-2008. L

I would like to thank all of you for your kindness, & for sharing my sorrow upon my husband's death. Sarah M. Martinez.

Your many expressions of sympathy & offers of assistance during the recent loss of my husband, Walter, were gratefully received. My daughter, Jane and I will long remember this, & find comfort in the days to come. Marjorie Maschke.

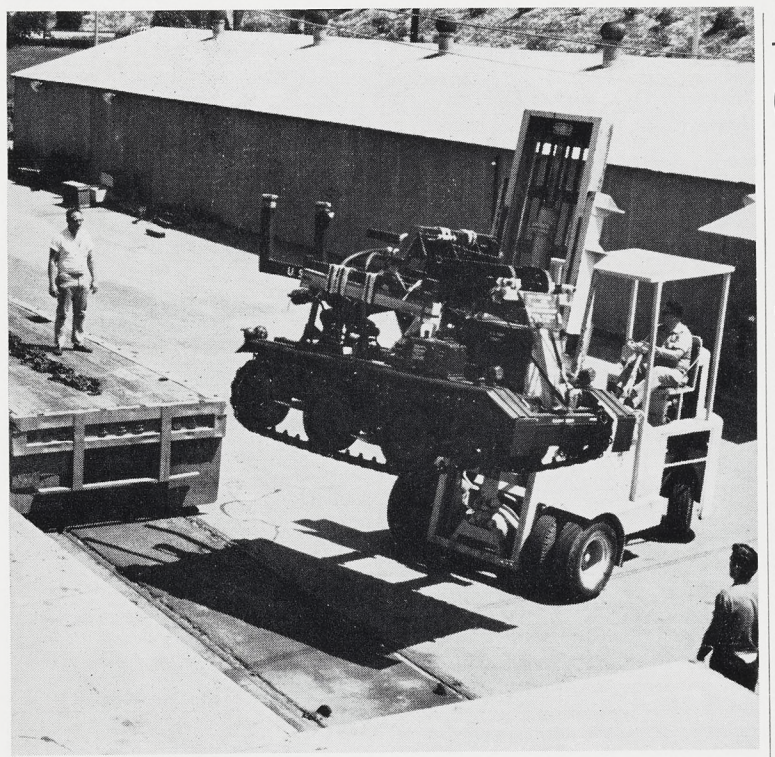
I wish to thank all my friends at Northrop for their kind consideration & thoughtfulness expressed during my illness & convalescence.—CHARLES BRADFORD, Editor.

For Sale or Trade

Ford country sedan, 1959, $650 or trade for motorcycle of equal value. Paramount, 630-1997. M

Home, 3-bdrm., 2 baths, air conditioned, swimming pool, Palm Springs, Racquet Club Estates, $25,000 or will trade for property in Los Angeles or Orange Counties. Torrance, DA 4-8189. M

Reducing Table, Stauffer, leg & hand bar, $150 or trade for stereo or hi fi radio or colored TV. Hawthorne. 675-6020.



LEADERS OF PARADE—Hawk loaders are moved from flatcar at Anaheim to Nortronics plant for modification (see story on page 1).

NATO OFFICERS TOUR P.V., NORAIR PLANTS

(See photo on page 4)

More than 80 NATO officials, representing 13 of the 15 member nations, have completed a visit to Norair and Nortronics Divisions, where they were briefed on Northrop capabilities.

As staff members of the Military Committee and Standing Group, based in Washington, D.C., the military officers were on an orientation tour of military installations and defense contractors.

The men are members of the highest ranking organization within the North Atlantic Treaty Organization. Their trip was sponsored by the Department of Defense.

At Nortronics (Palos Verdes), April 7, the group was greeted by Dr. William L. Parker, Nortronics Marketing manager, and Lew Nelson, director of Test section for Norair.

The NATO officers toured the research laboratories, viewed a film of the F-5 in action, and saw demonstrations of Vigicon and other equipment developed by Nortronics.

Two of the NATO nations represented—Norway and Turkey—are scheduled to receive F-5 shipments in the near future.

Norair facilities at Hawthorne hosted a second group of officers April 21. The visitors "trooped the line" where F-5's and T-38's are assembled.

Both groups of officers spent the better part of a day at Edwards Air Force Base, where they inspected the F-5, T-38 and X-21. Major General Irving Branch, commander of the Air Force Flight Test Center, conducted a briefing on the X-15 and XB-70 as well as Northrop aircraft.

Norair Base Administrator Jack Farley, assisted by pilots Hank Chouteau and Dick Thomas, held a question and answer session on Northrop planes for the visitors.

Military Committee and Standing Group trips are part of a series of periodic orientations sponsored by the Department of Defense and the U.S. representative to the Group.

VIGICON

(Continued from page 1)

for missile and satellite trajectory display.

Vigicon display systems have grown out of 17 years work at Nortronics on acquisition, transmission, processing and presentation of data.

"Realizing that displays had become a discrete technology," Mr. Chiles said, "Nortronics established a special group in 1960 to serve the increasing demand for control center display equipment."

Since that time eight major display systems contracts have been awarded the Division.

Vigicon is actually a family of ultracompact, automated projectors and accessories.

A presentation might include a map from one projector showing the geographical area a spacecraft is currently over; a colored line from another projector showing the path of the craft; a line of another color from a third projector showing satellites which are orbiting in the vicinity of the craft's flight; and numerical data showing altitude, speed, and other vital statistics.

Each projector has a different function, and the group may be used all together or selectively for closer study of a particular aspect of flight.

Data is fed into computers and displayed in real time, with no intermediate processing.

Travel, Reservation Function Re-Locates

Re-location of the Nortronics Division Travel and Reservation function to the Anaheim facility has been announced by F. W. Lynch, vice president and manager—Operations.

All approved travel and hotel reservations may be made by calling ext. 374 or 375. Airline tickets will be delivered to the individual traveler.

Travel allowances may be obtained from the Material Cost unit at Anaheim, Travel Accounting at the Johnson building, the main lobby at Palos Verdes.

NRC SPORTS

Cage, Tenpin Champs Crowned

HAWTHORNE LEAGUE OPENS FOR SUMMER

Summer bowling activities for Northrop folk in the Hawthorne complex are either opening this week or soon, NRC commissioners at Norair and Nortronics report.

And there is still room for bowlers in most leagues.

Mixed leagues are rolling on Monday evening and Saturday (after Friday shift) morning at Tropicana; on Wednesday and Thursday at Missile; and Thursday at both Gardena and Southwest.

Men's leagues meet Monday at Tropicana, Tuesday at Missile and Wednesday and Thursday at Del Mar.

Further information is available through Personnel Activities offices or Commissioners Dick Miller (Ext. 692) and Dorothy Baldwin (Ext. 268) of Nortronics and Bill Myerson (Ext. 4293) and Vi Jennings (Ext. 2492) of Norair.

Summer leagues with their relaxed pace and short schedule are ideal for beginning bowlers to break into league activities and establish averages for the forthcoming winter season.

* * *

DOUBLES WINNERS HAVE CLOSE CALL

Olive Weaver and Cam Moniello copped women's honors, while Earl Saunders and Bud Wegnes paced the men in the first annual Northrop Doubles Matched Game Bowling Championship held April 24-25 at Del Mar Lanes.

Sixty-six entries from throughout Northrop took part. Qualifying rounds were held April 24 with the top eight men's teams and the top four women's duos entering matched game rolloffs on Sunday.

In the finals the Weaver-Moniello team posted a 1079, while the team of Elaine Dower and Mary Williams came in with a 1077.

A 1216 final round for Saunders-Wegnes was better than the second-place finishers Shu Kitahata and Harry Scapin with a 1052 total.

Bob Martin won a special award for the top game of the affair, a 225 game with an 18-pin handicap for a 273 total.

Winners received trophies, plus bowling balls and prize fund returns.

* * *

ANAHEIM BOWLING CHAMPS CROWNED

The big winter bowling season is over and champions have been named and crowned in Nortronics (Anaheim) leagues for 1964-65.

The 10-team men's league found Paul Smith winning high game with a 248 and Bill Palmer taking high series with a 634. Team honors went to Team No. 4 (Vito Depaul, Fred Davis, Tom Cheney, Jim Melatti and John Catlett). Team No. 3 (R. Christian, Ray Sundquist, Carl Carlson, L. B. Lambeth and Bill Christian) took second. Special recognition went to the cellar-dwelling Team No. 8 (George Radoumis, Lou Albertson, Don Slawson, Clyde Rautti and Paul Smith). Final league action, a sweepstakes affair, was held April 15.

In the Mixed League Vito Depaul posted a 296 for high game for men with Kathy Tague and Betty Womack tieing with 262s. His series fell to Bob Lawther (695) for the men and Judy Sutherlin (666) for the ladies.

Team No. 5 was the league winner and was made up of Bob Lawther, D. Nicholson, R. Nicholson, Shirley Lawther and Vaughn Peal.

Second-place honors fell to Team No. 7 (Frances Chandler, Vito Depaul, Bev Rieffer, Jim Melatti and Clinie Chandler. A sweeper was held April 27.

AMPLY NAMED AGGREGATION — The Zephyrs have swept through NRC cage league undefeated this season, will be feted at awards "get together" Friday at NRC Clubhouse. Team members standing (left to right) are Sheldon Williams, Jerry Naulls, Alvin Hall, Maurice Jackson, Skip Nelson, Mel Overton and Dolph McConnell, manager. Kneeling are Blanchard Davis, Charlie Talbot, Henry Andrews and Mose Smith.

RESEARCH

(Continued from page 1)

until now have been assigned to the Research and Advanced Technology section of Northrop Ventura. This team of experts has done outstanding work in studying, detecting and measuring the effects of nuclear blasts.

Dr. Hicks has named Dr. Walter Crandall to be assistant department manager and Dr. Theodore Hallman to be director of advanced technology. Both have been key research executives at Northrop Ventura.

The new department will continue to be housed at Northrop Ventura until arrangements are completed for the move into a building in the Rancho Conejo Industrial Park near the Ventura Division plant.

George C. Grogan, jr., an engineering and marketing executive with Northrop since 1959, has been named vice president-manager, Technical department, succeeding Dr. Hicks, at Northrop Ventura. Mr. Grogan joined Northrop's Norair Division in 1959. His most recent assignment at Norair had been as assistant manager of Marketing.

Previously he had been chief of aero sciences and director of research and technologies.

NOLAN

(Continued from page 1)

Nolan's advancement to senior vice president. "As Corporate vice president, Manufacturing and Administration, he has brought into the corporate office his long experience in the aircraft and aerospace industry.

"Mr. Nolan will continue to have responsibility for establishing and administering corporate policies and practices in the areas of manufacturing, materiel, facilities, organization, industrial relations and general administration. With his new title, he will have broader management responsibilities in these areas."

"Mr. Nolan's new title is to take effect immediately."

Mr. Nolan's entire career has been spent in the aircraft and aerospace industry. From 1934 to 1939 he was associated with the Northrop Division of Douglas Aircraft in El Segundo, California. When the present Northrop Corporation (originally Northrop Aircraft, Inc.) was founded he became supervisor of tooling. He advanced steadily within the company, becoming manager of production engineering, assistant factory manager, and director of service.

In 1951, Mr. Nolan established the company's facility at Anaheim, California, and for five years was in charge of its activities in the design and manufacture of ground weapons fire control systems, opto-mechanical devices, electrical and electronic equipment, precision weapon system components, and major weapon subsystems.

He is a native of Southern California.

ESTATES

Almost without exception, the courts have held that estates of deceased owners or co-owners of Savings Bonds have no right, title or interest in the Bonds when there is a surviving beneficiary or co-owner. Such decisions have been handed down by courts in at least 32 states, including the highest courts of 19 of those states.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 7 | May 19, 1965

Northrop Rep Is Elected by IDEP Board

David Kessler of Nortronics (Anaheim) Engineering Reliability has been re-elected as a member of the National Contractor Advisory Board of the Interservice Data Exchange Program (IDEP).

Mr. Kessler is Corporate Reliability Data coordinator for Northrop's participation in the IDEP and coordinates the efforts of six Reliability Data Exchange representatives located throughout the Corporation.

The national group acts as a representative of Contractor Data coordinators (CDC) to government agencies and to industry in matters that facilitate IDEP. It is composed of 13 members acting as representatives for CDCs located in some 169 major companies and military installations in the United States and Canada.

Mr. Kessler met with 150 of these representatives recently in a national conference held at Albuquerque, New Mexico.

The conference was devoted to improving techniques of interchanging test and reliability information on component parts in missiles and space systems.

The over-all IDEP program is designed to avoid repetition of costly tests of commercial items

(See IDEP, page 6)

NAS Obtains New Illinois Facility

Northrop Architectural Systems, wholly-owned Northrop subsidiary based in Los Angeles, began production this month in Murphysboro, Illinois, in a move toward a larger share of the architectural hardware market in the east and midwest.

NAS, which produces the Arcadia line of sliding glass doors, storefronts and entrances and sun control systems, among other products, also has production affiliates in France, Spain and Japan, and has licensing agreements with firms in Norway and Lebanon.

To read more about Northrop Architectural Systems, turn to page 2.

WHAT ELSE WILL IT DO?—Members of Nortronics Test and Inspection Equipment Review Board give electronic test equipment close "once over." Group gives final approval on purchase of equipment, handles many other important chores. Members, from left, are Wes Toy, Adie Weishaar, Lauren Persons, Frank Cagwin and Phil Painchaud.

Group Keeps Close Tabs On Test Equipment Needs

There are five men at Nortronics who, as a group, are probably more intimate with the Division's West Coast test equipment than anyone else.

They comprise the Nortronics Test and Inspection Equipment Review Board and are responsible for studying and evaluating the more than 5000 pieces of specialized test and inspection equipment used by the Division.

Valued at more than $2 million, the equipment is categorized into 1700 different types.

Items range from simple flow meters to highly sophisticated automatic testers.

The Board maintains a never-ending vigil on new equipment development, but approves for acquisition only after detailed study.

All requests for test or measuring equipment are submitted to a review by the Board, whose members are appointed by department heads.

Current members are Wes Toy, Technical; Lauren Persons, Operations; Frank Cagwin, Industrial Engineering; Phil Painchaud, Metrology and Quality Assurance; and Adie Weishaar, Manufacturing Engineering. Mr. Weishaar serves as chairman.

Among the first groups of its type, the Review Board was created some eight years ago and has been copied by many firms and military organizations.

The Review Board keeps two overriding objectives in view at all times—the highest practical degree of standardization and the multipurpose use of test and inspection equipment throughout Nortronics.

Each request for equipment costing more than $200 is closely studied. Do we need it? Why? Is other equipment available to do the same job? Can it be used for other purposes? Does it require special calibration or maintenance? Can it be procured for less? These and many other questions are asked of each requested item.

"The special skills of our board

(See REVIEW BOARD, page 6)

NORTHROP FIGHTER PRAISED BY TOP U.S., ROK OFFICIALS

Northrop-built F-5 jet fighters joined the free world's Far East defense force for the first time April 30 when the first squadron destined for use by the Republic of Korea Air Force was turned over officially. Ceremonies marking this event were held at Suwon Air Force Base, Korea.

Winthrop G. Brown, United States Ambassador to Korea, noted that the delivery of the F-5s demonstrated again "our mutual determination to resist aggression."

"These modern, supersonic aircraft are the latest evidence of my country's resolve to honor its military commitment to Korea and to protect the free nations of the world," Ambassador Brown added.

Korean President Park Chung Hee said the F-5s represent "another milestone in the development of our defense capability." He spoke of the communist threat in South East Asia, the necessity of strengthening defense postures and added the addition of new fighter aircraft fulfilled "a long-cherished wish of the ROK Air Force."

"I am told that these new fighter aircraft (the F-5) are a product of the long technical experience possessed by the Northrop Corporation, a renowned American aircraft manufacturer," President Park added.

"I am confident that in air-to-ground and air-to-air operations they will amply demonstrate their remarkable capability that surpasses that of communist North Korea's aircraft."

General Hamilton H. Howze, commander, US Forces Korea, said the air superiority represented in the F-5 made the delivery highly significant to Korea and the Far East defenses. He noted the F-5, as an air superiority fighter with "Sidewinder" air-to-air missiles, "can match any jet aircraft in the world today."

He also noted its ability to perform reconnaissance missions, serve as a fighter-bomber and provide air-to-ground for ground troops.

Death Valley Days: 'Rats' Snowed Out

Here's one for the record books — the Desert Rats of Nortronics (Anaheim) were snowed out recently on a visit to Death Valley, of all places.

The hardy explorers had planned to camp in the Panamint Range, but found six inches of snow in their favorite spot. So they moved down into lower Death Valley.

The group visited various points in the area and partook of the lore of the region that was once a thriving copper and silver mining center of 5000 residents.

ANAHEIM ADVISORS HONORED BY J-A

Four Nortronics (Anaheim) men were honored recently for long service to Junior Achievement activities in the Orange County area.

Acting on behalf of Junior Achievement, J. M. Ricketts, Nortronics deputy manager of Operations, presented special awards to the quartet.

C. L. Gross received a pin enlaid with a ruby for his six years of service to Junior Achievement. Mr. Gross was an advisor for the first Junior Achievement firm sponsored by Nortronics (Anaheim) and each subsequent firm organized.

Two-year plaques went to A. C. Weishaar, M. A. Seeley and J. A. Lyles recognizing two years of work with JA.

All four men were advisors for "DESCAPS," the Junior Achievement firm sponsored in 1964-65 by Nortronics (Anaheim).

ON RETIREMENT EVE

Early Bird Goes Supersonic

For a man who almost gave up flying after soloing, a supersonic flight aboard a Northrop F-5B proved to be "one of the most memorable experiences in my life."

There were contrasts, of course, for between the two events Ed Bates had seen almost 53 years pass.

Edmond E. "Ed" Bates made his supersonic sortie on the eve of his retirement from Northrop Norair late last month. He rode with John Januleski, supervisor of Production Acceptance pilots at Norair (Palmdale).

And Mr. Bates is now a remarkable 69 years young!

"My first flight did not take me as high or as far as the first Wright Brother's flight," Mr. Bates said. "And when it was all over there were many doubts in my mind that flying was for me."

Like many farsighted youths of his day, Mr. Bates realized the war in Europe would soon involve America. So he helped set up the Harvard Reserve Aero Corps. In March 1917, he was called to active duty and reported for flight training at the Curtiss School, Miami, Florida.

War was declared in April 1917, and in May Mr. Bates joined 12 collegiate aviators and traveled to Europe to assist General (then Colonel) Billy Mitchell establish advanced flying fields for American use in France.

Following World War I, Mr. Bates returned to the United States and joined Gallaudet Aircraft Corporation.

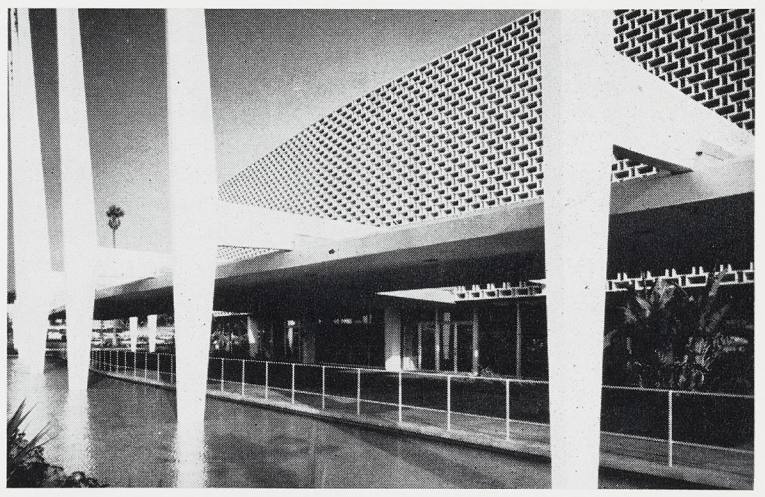
In 1951 he joined Northrop and for a number of years Mr. Bates has served as an executive advisor to Bob Cat-

(See BATES, Page 6)

PIONEER ACHIEVER—Lee Gross (center) holds six-year pin earned for advisory service to Nortronics (Anaheim) sponsored Junior Achievement firm. Other advisors who received recognition and awards were (from left) Adie Weishaar, Cy Seeley, Mr. Gross, Jim Ricketts, and Jim Lyles. Mr. Ricketts made the presentation.

BACK YARD

Local Los Angeles market is not being slighted in period of overseas expansion. Hughes Market (left) in Northridge, Granada Hills, is fronted with NAS entrance, as is Santa Monica Civic Auditorium (right). Numerous Los Angeles area luxury apartment buildings have NAS entrances, sliding doors and other components of an "architectural system."



ON WAY UP

NAS components (above) are hoisted into place during construction of one of many office buildings being built in Southern California. Craftsmen (below) assemble aluminum frame for storefront at current residence of company in City of Commerce. NAS will move to larger facilities in City of Industry this summer.

Northrop Architectural Systems Circles Globe in Business Quest

Moving around the world in three years isn't much of a record in the era of Mach 2 aircraft, unless, like Northrop Architectural Systems, you've established factories and licensing agreements in half a dozen countries on the way.

Like Magellan in the 16th century, the Northrop subsidiary has sailed westward from its front door in Los Angeles and, after establishing itself in Asia and Europe, is presently starting manufacturing in Murphysboro, Illinois, for the eastern and midwestern markets of the United States.

Next July, NAS headquarters will move into new facilities in the City of Industry, about 20 miles from the point of initial expansion in 1962.

President Henry E. North jr., who is as much at home on the continent as in his Fullerton home, spent almost three years in establishing the NAS name around the world.

Of course, his job was made much easier by the quality of his product, the Arcadia line of sliding doors and windows, sun control systems, storefronts and entrances, and window wall systems.

Anyone who asks around the present Los Angeles headquarters about the history of the company would probably get three different stories. That's because there are three different histories.

Acme Metal Molding Company, which was founded in Los Angeles in 1907, was purchased by Northrop in 1960. Arcadia Metal Products, founded by Mr. North in 1948, was acquired in 1961.

The combination of people and technology from these two companies, plus a little seasoning from Norair Division and the Corporate office, is the basis for the "modern history" of NAS.

The reason for naming the product line Arcadia rather than Acme is one of simple salesmanship.

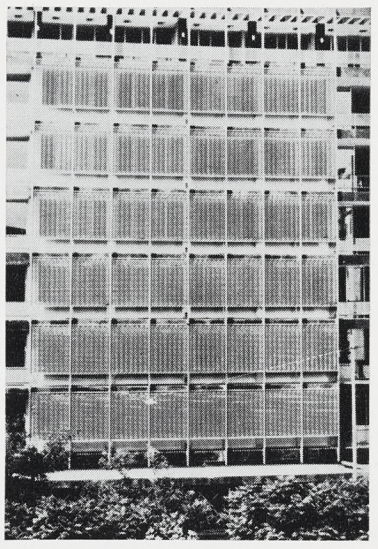
"The word means contentment, pastoral simplicity, a vision of happiness in a land where home and countryside are one," Advertising Manager Pete Vogel says.

"Arcadia is a perfect name for sliding glass doors—a revolution in architecture which has opened homes to a new dimension in living."

It is probable that many Northrop homeowners have NAS doors and windows and don't realize it. Employees of Northrop Space Laboratories in Hawthorne walk through an NAS entrance everyday they come to work.

The Arcadia name is enjoying such public acceptance that NAS

(See NAS, page 5)



MIDDLE EAST

Building (above) in modern Beirut, Lebanon, is complete with NAS sun control system and entrances. Northrop subsidiary licenses its products through affiliate in Lebanon. Maze of door frames (below) are inspected at Los Angeles plant before glass is installed.

Key elements in system are these NAS executives (from left, top row): President Henry A. North jr., Vice President Don White, Treasurer Dan Hill, New Products Manager Irvine Styer; (from left, bottom row): General Sales Manager Lloyd Johnson, Manufacturing Control Manager Jim Kindred, Advertising Manager Pete Vogel, Marketing and Sales Director Paul Leslie.

FACE LIFTING

In a before and after look at San Francisco office building (right), another area of NAS expertise makes itself evident. Complete modernization transformed complexion of entire block. Colone building (left) in Mexico City uses NAS window wall systems, was early project in growing international market of Northrop subsidiary.

Space Electronics Symposium Led By Norair's Wong

Dr. C. M. Wong, Northrop Norair chief of Structures and Auxiliary Systems is general chairman for the 23rd annual meeting of the Aerospace Electrical Society and the Space Electronics symposium. The symposium is jointly sponsored by the AES and American Astronautical Society May 25-27 at the International Hotel, Los Angeles.

The symposium will include six technical sessions, one evening panel discussion, an industrial exhibit, and a highlighted awards banquet.

R. F. Miller, vice-president-Technical, of Nortronics, and R. M. Dijulio also of Nortronics, will serve as technical directors.

According to Dr. Wong, special awards will be presented to Dr. Wernher von Braun, director of NASA's Marshall Space Flight Center at Huntsville, Alabama, and General Bernard A. Schriever, commander of Air Force Systems Command.

California Governor Edmund G. Brown and Dr. Theodore Maimn also will receive special awards.

Principal speaker at a banquet May 26 will be Dr. B. H. Goethert, chief scientist for Air Force Systems Command.

M. Carl Haddon, corporate vice-president of Lockheed, will serve as toastmaster.

Other luncheon speakers will be Dr. E. R. Stuhlinger of NASA and Dr. W. C. Williams of Aerospace Corporation.

ESTATES

Almost without exception, the courts have held that estates of deceased owners or co-owners of Savings Bonds have no right, title or interest in the Bonds when there is a surviving beneficiary or co-owner. Such decisions have been handed down by courts in least 32 states, including the highest courts of 19 of those states.

NORTHROP NEWS

Vol. 23 No. 7

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

ALASKAN LIKES WARM CLIMATE— BUT VIET NAM?

For an Eskimo raised on seal, polar bear and caribou, Nathaniel Ekalook is doing pretty well sampling Vietnamese delicacies in semi-tropical Saigon.

Born and raised at Point Barrow, Alaska — the top of the world — he has just been assigned to Viet Nam on the Back Porch Communications system of Page Communications Engineers, Inc., Northrop subsidiary in Washington, D.C.

A veteran technician on radar and navigational aids projects in Alaska, Nate has also served as assistant to the head of the Electronic and Electrical Engineering Department of the University of Alaska.

Cruise to Catalina Planned by Sailors

Treasure hunts, Sabot races and barbecues will be on the agenda as "added fare" when the Northrop Sailing Club welcomes a new season with a Memorial Day weekend cruise to Catalina Island.

Gathering point will be the Catalina Harbor opposite the Isthmus.

For further information contact NRC Commissioner Bernie Bowen at ext. 2515, Norair.

Air Library Founded

University of Southern California has announced the founding of the Library of Aeronautical History, described by officials as a repository for the history of American air transportation.

Laser Behaves After Dunking In Glycerin by Ventura Team

An unexpected discovery by a 4-man Northrop Ventura laser research team, headed by Dr. Donald V. Keller, may have considerable potential in deep space communications, high speed photography and techniques for determining how and why a laser behaves the way it does.

Laser light is unusual in that it can travel for miles in a straight line without much spreading out. There is a trick to it, of course, and it's done with mirrors.

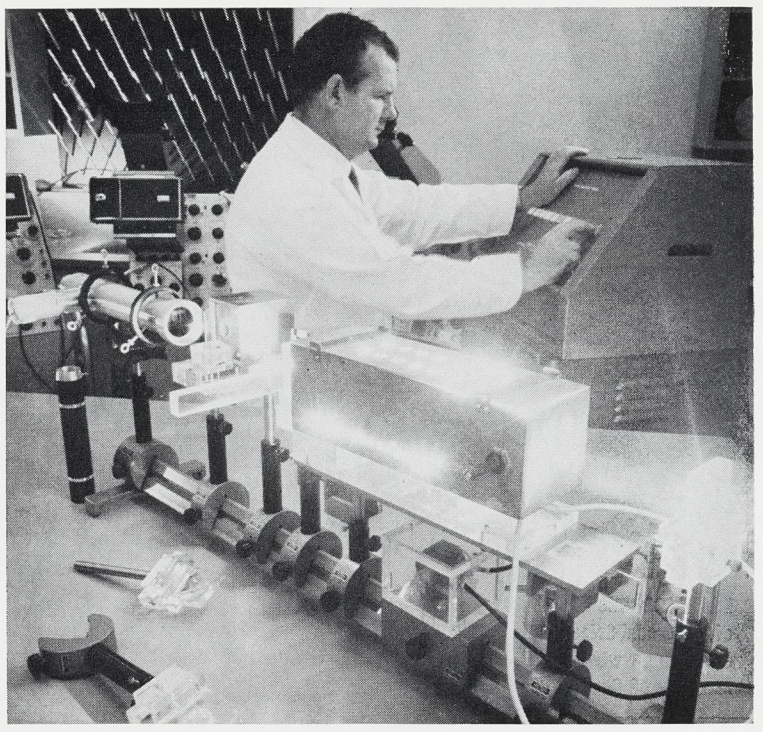
Dr. Keller

A laser is a simple looking device with an astonishing potential. A ruby crystal rod is set into a box with mirrors stationed at each end. A photo flash tube, which looks like it may have come from a neon sign, coils around the rod.

Light from the flash tube excites atoms in the ruby crystal. The atoms return to their normal state, but in so doing they give off a light of their own. This light bounces off a mirror which in turn reflects the light back to a mirror at the other end.

The exchange between mirrors goes on (like a high speed ping-pong game) until a tremendous amount of light is built up from frenzied atoms in the tube. An avalanche of light thus builds up by forcing the excited atoms to return to their ground state and a "souped up" light pulse bursts through one of the mirrors which is partially transparent.

However, there is a problem of control—not in aiming the beam, but in regulating the intensity and frequency of bursts. That's where Dr. Keller, Bert Davis, Marlyn Graham, and John Curnow make their debut.



VENTURA RESEARCH — John Curnow of Optical Laboratory conducts laser experiment which led to unexpected breakthrough in control of laser energy. Deep space communications, high speed photography and laser theory itself stand to benefit from discovery.

They immersed the whole device in a liquid (glycerin worked where other liquids became unstable from the intense heat). They added some original developments in pumping and measurement techniques, and now can control both the frequency and intensity of laser beams.

Dr. Keller isn't saying at this time what causes the phenomenon, but he does know the liquid's index of refraction is part of the key.

It seems that when the light photons are generated in the tube, they bounce at many different angles off the sides of the crystal and the mirror on their way through the rod. Each different light beam dissipates energy. Since there are usually millions of beams bumping around in the tube, the exact amount of energy released through the mirror is never the same.

The refractory characteristics of the liquid tends to reduce the amount of separate reflections (or modes) to a minimum number which can be translated into theoretical equations and solved (with the help of a computer).

With their new techniques, the Northrop Ventura researchers have come up with empirical numbers to fit into existing theoretical equations on the intensity, shape and frequency of the output bursts.

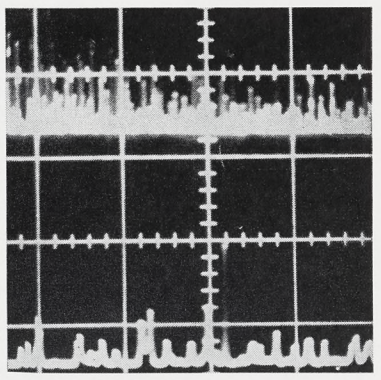
As for the laser theory, the equations checked out for the most part but the significance of Ventura Division's work is in the fact it was the first time the equations could be empirically substantiated at high energies. Also the pulsing is continuous and does not approach a steady output as the theory predicts.

While there has been a great deal of talk about lasers in communications, it has been couched in terms of "potential". Again the problem of "actuality" hinged on controlling laser bursts so they could carry information.

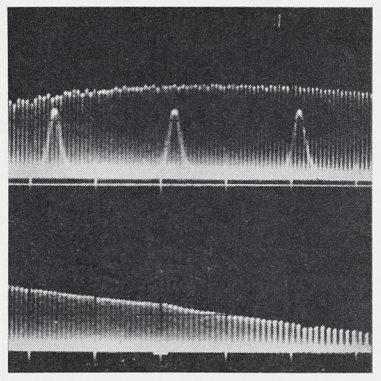
Now, according to Dr. Keller, a high energy ruby laser can meet this criterion for the first time with the immersion technique.

Potential in communications with light beams lies in its "supershort" wavelengths which are measured in millionths of an inch, compared to radiowaves which are tenths of inches and greater.

BRAND X



NORTHROP VENTURA



Oscilloscope reveals breakthrough in controlling laser pulse. Jagged peaks of top photo shows uncontrolled bursts. Bottom photo shows even frequency of pulses as well as controlled intensity.

Former Northrop Assembler Killed in Viet Nam Crash

A former aircraft assembler who learned to fly in the NRC Flying Club, who won the Distinguished Flying Cross in Korea and who became a flying legend in Viet Nam, before being killed last month, was buried May 4 with full military honors at Ft. Rosecrans National Cemetery in San Diego.

Air Force Major William W. McAllister crashed on the eve of his departure from Viet Nam after a year of combat service.

Known as "Mac the Fac" (for Forward Aircraft Control), Major McAllister flew an unarmed, L-19 spotter plane to seek out enemy troops and relay their positions to fighter planes. He survived countless close calls on his low-level passes by sheer daring and piloting skill alone.

His sister, Mrs. Mary Jo Horn, is a budget analyst at Norair.

Major McAllister became interested in flying while working at Northrop during the 1945-49 period. From Northrop he went into aviation cadet training. His mother, Mrs. Ann Ferguson, also worked at Northrop during the same period.

While at Northrop, he worked as a general helper, an assembler in Aircraft Structures, and a template maker.

Major McAllister won national recognition last month in a TIME magazine cover story on American servicemen in Viet Nam.

A family service for Major McAllister was held in Victorville May 3, and a military funeral was conducted the following day in San Diego.

He is survived by his widow, Gail, and two children, Robert and Corey, as well as his mother and sister.

Last Aerial Tours Set for Saturday

Last opportunity for Northrop folk to take an aerial tour of the Los Angeles area will be offered Saturday in "Operation Scoutflight."

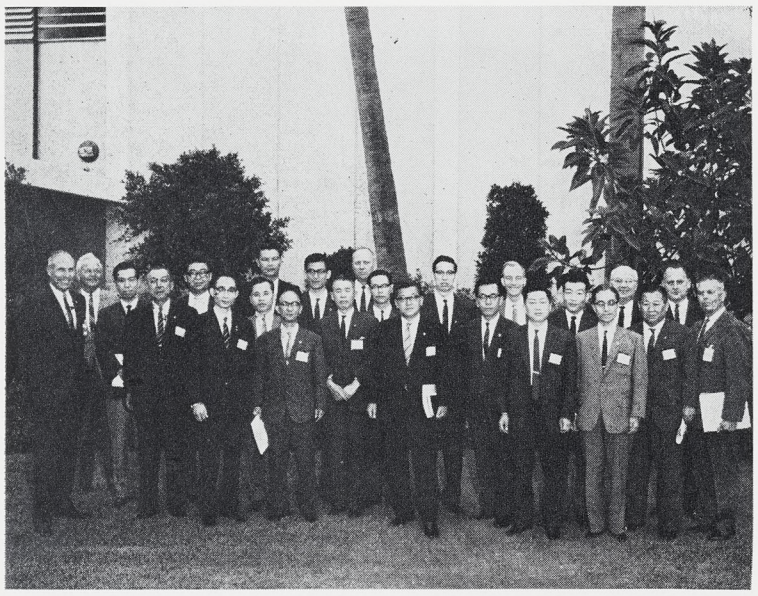
Pacific Southwest Airlines Electra-Jets will depart Los Angeles International Airport at 3, 3:30 and 4 p.m., making a 20-minute flight over and around Los Angeles. Passenger check-in is 3 p.m. at the PSA terminal area. Tickets are now available through the Norair Personnel Activities office.

The cost is $5 per person with proceeds going to support Boy Scout activities in the area.

SAFETY HONORS

Norair's Machine shop was grand sweepstakes Good Housekeeping award winner for March. Frank Lyons (left), Housekeeping awards chairman, and Robert Tompkins, general supervisor, hold symbolic plaque. Looking on are J. M. Brown (far left), and Joe Jarczewski, both of Machine shop.

Japanese Quality Control Team Makes Repeat Visit to Norair



BACK FOR SECOND TIME—Norair was host to Quality Control team of Union of Japanese Scientists and Engineers recently. Visitors are shown above with Norair men who participated in day of presentations. Bob Catlin (left), Norair manager of Quality Control, was host.

Norair Division was host May 6 to a 15-member Japanese Quality Control team representing the Union of Japanese Scientists and Engineers.

Norair was the first stop for the group on a tour to the U. S. and Mexico. Northrop was the only aerospace firm scheduled to be visited.

The visit was a "repeat" for the Japanese organization. One year ago a similar team called at Norair as well as other aerospace firms in the Los Angeles area. They made special requests to have Northrop included on their stop this year.

"Quality Cost System" was the theme of the visit, with special emphasis on Norair's numerical control operations.

R. S. Catlin, Norair manager of Quality Control, was host, along with E. C. "Bud" Bennett, chief of Quality Engineering, who helped arrange the Japanese tour for the American Society for Quality Control which he serves as a national vice president.

Participating in presentations were Vern Parker, Dan O'Halloran, Dave Rankin, Roy Wolford, Clarence McCrary, E. L. Richardson, Chuck Milne, Dan Lund, Ed Regalado, Bob Bullington, Lou Bednarchik, Mr. Catlin and Mr. Bennett.

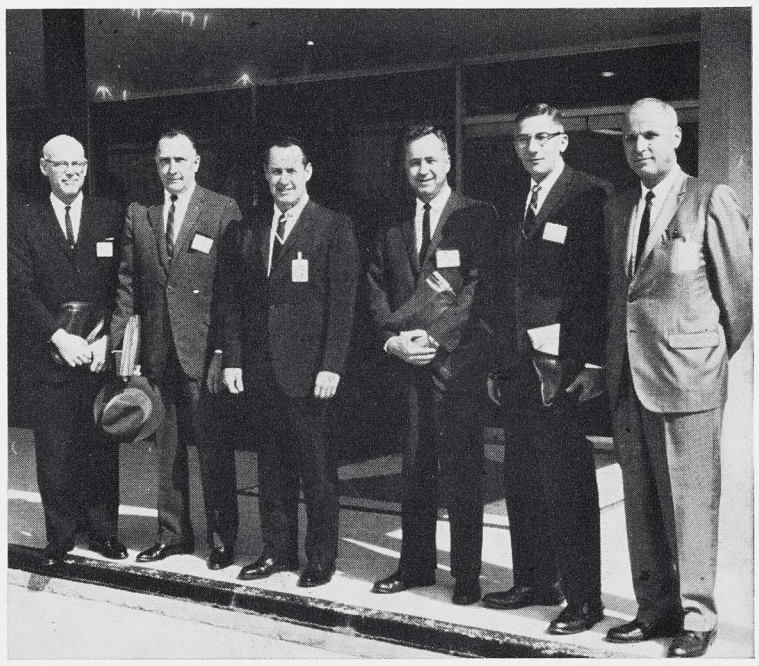
"We found the talks with our visitors interesting and the exchange of information valuable," Mr. Catlin said. "It is always a pleasure to discuss mutual Quality Control problems on an international basis."

Mr. Catlin pointed out that the Japanese visitors, through their affiliation with the Union, represented a majority of Japanese industrial firms and businesses.

"Thus, our role as host to the group helped to cement already close ties and to improve Northrop relationships with Japan and its industries, a valuable factor in an era when international cooperation is so important."

Russell Black of Northrop Nortronics served as interpreter for the presentations.

NIKE-X VISITORS



Northrop is carrying out contract to support U.S. Army Nike-X Weapon System Project office in area of management services. Recent discussions at Hawthorne brought four visitors (above) with Northrop men for talks and presentations. Group includes (from left): A. J. Patten (Western Electric), Harvey Peebles (Nike-X Project office), T. L. McCarthy (Northrop), Gordon Walker (Western Electric), Joe Olszewski (Nike-X Project office), and R. W. Rolfe (Northrop).

QUALITY CONTROLLERS TRADE NOTES AT L.A. CONFERENCE

Northrop Corporation talent was utilized extensively May 3-5 when the 19th Annual Technical Conference and Exhibit was staged by the American Society for Quality Control.

Participating were some 3000 representatives of national and international organizations who gathered at the Biltmore Hotel, Los Angeles. Conference theme was "Quality—Key to a Nation's Economy."

Norair Division's W. F. Hunt, a Quality Control supervisor, delivered a speech on "The Economy of Numerical Control Inspection" during an Inspection session.

Serving as moderators at various sessions were: R. S. Catlin, Norair manager of Quality Control; Frank McNabb, Nortronics director of Quality Assurance; and E. C. "Bud" Bennett, Norair chief of Quality Engineering. Larry Knight, Northrop Space Laboratories director of Quality Control, coordinated vendor-vendee activities.

Mr. Bennett is currently a national vice president of the ASQC and was among those instrumental in bringing the conference to Los Angeles for the first time this year.

SALLY PUTS STOP TO FORMS FLIP, COLLECTS CASH

Sally Wilhelm has helped put a stop to the forms flip-flop.

Which is one way of saying a Norair Division employee found a quicker, more efficient method for performing a routine task and parlayed the idea into cash ($214) through the Suggestion Award Plan.

Mrs. Wilhelm, a material planner in the Raw Stock function of Material section, noted Shop Orders for requisitioning parts contained five copies with the fifth copy utilized by Materiel and Accounting organizations. The front of the form was filled with information required by the other groups. Materiel personnel were required to flip the form and transfer debit information to the back before adding a code number and credit information, an operation requiring as many as five lines at times.

Mrs. Wilhelm

On a volume of about 46,000 forms per year, this involved a lot of flipping, plus the possibility of human error in transferring information.

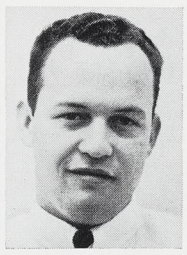
Mrs. Wilhelm further noted Tooling information, one of the entries on the front of the card, was not required in either Materiel or Accounting functions.

She proposed Tooling data be eliminated from the fifth copy and the space cleared be reserved for Materiel information which made it possible to do away with form flipping.

Skeet Shooting Neophyte Takes Southland Trophy

The newest Davy Crockett of Northrop Ventura is a young development planner who, after only six months of practice, is a Southern California skeet champion.

A comparative newcomer to the Division as well as skeet shooting, Ron Parks took first place in Class E competition April 25 at the annual meet held this year at Golden Valley Gun Club.



Mr. Parks

His score of 97 hits in 100 shots topped the number two finisher by five points. Next stop is the California championship scheduled later this summer.

As Class E winner, he became one of five Southland champs. Under rules set down by the National Skeet Shooting Association, shooters are classified according to average scores during the year. While his average of 82 this year had placed him in Class E, his winning the championship automatically advanced him to Class D.

Mr. Parks prefers the close range, high speed competition of skeet to the longer range, slower trap shooting. A round of skeet involves knocking down discs propelled alternately from two control boxes (right and left).

Participants fire from eight locations, moving in a semi-circle from one control box to the other. Closest range is five yards and the longest is 27 yards.

Targets move from 65 to 70 miles per hour and twice during a round, discs are fired from both control boxes simultaneously and the shooter must knock them down one after the other.

Ron joined Northrop Ventura four months ago and is assigned to Manufacturing Controls.

CANOPY CAPERS

It's a Bird, It's a Plane . . . It's Radhoff

For a sky diver with more than 400 notches in his back pack, Northrop's Ron Radhoff has an unusual disdain for his parachute. "Hanging on a canopy" is just a means of saving his life, he says. What he really lives for is that 40 seconds between bail out and pulling the ripcord — a period known as free fall.

"In free fall nothing obstructs the view," he says. "There is a transition to complete quietness when the hum of the engine abates, and there is a feeling of freedom and comfort."

Mr. Radhoff, a designer at Northrop Space Laboratories' Huntsville, Alabama facility, is president of the Huntsville Sport Parachute Club and chairman of the Cottonbelt Parachute Council, which covers seven southern states.

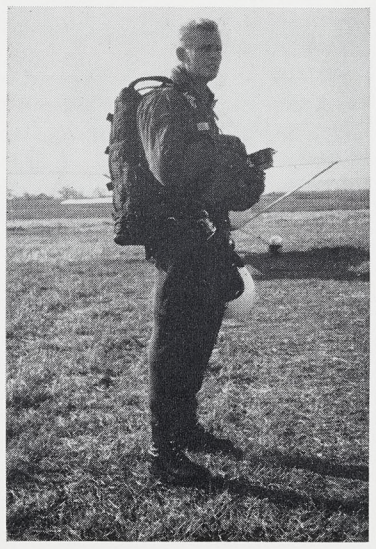
Huntsville sky divers have come a long way since their rather unusual beginning in 1961.

A few enthusiasts got together, read a few books on the subject, bought some equipment, rented a plane and jumped over Pryor Field in Decatur, Alabama.

After the first jumper was safely on the ground, the group discovered his parachute had been packed inside out.

A year later, the club became a member of the Parachute Club of America. With 33 members, including three women, now on the rolls, a set of stringent rules covers club activities, Mr. Radhoff said this week.

"Apprehension may be felt during 15 or 20 jumps," Ron said, "but once a jumper is over the hump and the desire to jump exceeds the fear of it, he is hooked."



Ron believes that at least 100 jumps are required to achieve mastery of control in free fall.

The average jump begins at about 8000 feet, with the chute opened at 2000 feet. Free fall is about 40 seconds and the last 2000 feet takes about two minutes.

"Sky divers can use certain body movements to change direction, maintain balance and move horizontally," according to Ron. "Some amuse themselves with turns and loops. The diver can do almost anything a plane can do except go back up."

A diver's speed of descent varies from 120 to 180 miles per hour, depending on his position, Ron added.

While sky diving is a potentially hazardous sport, strict safety regulations have kept the record clean in Ron's group. In 1500 jumps, there have been only three malfunctions, and in every case the reserve chute has opened.

Big Pomona Event Attracts Gem Club

Norair and Nortronics members of the Gem and Mineral Club have decided to hold an annual Memorial Day weekend field trip by participating in the California Federation of Mineralogical Societies annual show at Pomona.

This event, one of the biggest of the year for lapidary enthusiasts, will feature exhibits and displays unmatched for their color and competitive factors in the area.

The Gem and Mineral Club will enter various exhibits and take part in organized events, according to Commissioners Richard Hicks (Nortronics - Hawthorne) and Dan Kozlow (Norair).

Theme of the show, to be held at the Los Angeles County Fairgrounds, is "Gem Trails of the West."

Participants and visitors are welcome.

DISASTER AID

Shortly after major disasters the United States Treasury moves swiftly to offer cashing facilities and replacement of bonds lost by fire, flood or other catastrophe.

"ROYAL WELCOME" AWAITS YOU, TOO—The world's most famous mouse, Mickey, took over recently for a preview tour of Disneyland for Norair's Dick Pryor and Eleanor Heldt, Disneyland group sales administrator, who are mapping plans for Northrop families visiting the fun center May 28.

'Royal Welcome' Planned By Disneyland for Northrop

One of the world's most fabled and exciting fun spots — Disneyland—served notice this week it is mapping a "royal welcome" for Northrop May 28.

That's when all of the facilities in this fabulous recreation center will be reserved exclusively for Northrop family use.

The general public will be cleared from the park prior to the "magic hour" (7:30 p.m.) and until normal closing everything will be "just for Northrop."

Holders of Northrop - issued tickets may then enjoy rides, featured entertainment, attractions and facilities throughout Disneyland without charge. Naturally, usual concession and shooting gallery charges will be made.

Included is dancing in the popular Tiki Room as well as a chance to enjoy Frank Sinatra jr., the Pied Pipers and the Tommy Dorsey orchestra performing just for Northrop people.

Last year more than 9500 Northrop folk took part in this event.

So make a date and plan to renew old friendships with other Northrop employees at this big event, made possible through the joint effort of Northrop Recreation Clubs. It happens only once a year and this year is on the eve of a long Memorial Day holiday period.

CREDITORS

In several significant cases, courts have held that Savings Bonds registered in co-owner and beneficiary form, were not within the reach of creditors of the deceased owner, even though the estate was insolvent.

NAS: Modern History Is One of Expansion

(Continued from Page 2)

is directing merchandising effort to the direct consumer market, after dealing for five years almost exclusively with architectural firms and major builders.

"Of course, we'll still rely on architects and builders for our biggest share of business," Mr. Vogel said, "but a series of test advertisements in real estate sections of some of the country's leading newspapers have revealed a tremendous potential in direct consumer sales which have benefited our dealers and distributors."

Northrop employees are invited to inspect the doors and may purchase them at a special employees price.

To Jim Kindred, manager of Manufacturing Control, these new developments are just more stages in the evolution of his company. He has survived through adaptability to change. Now in his 29th year of service, he is the longevity champ of both of the companies which today are Northrop Architectural Systems.

An Acme alumnus, Jim joined up in 1936, when the company was called California Fireproof Door. As a youngster, he swept floors and earned $16 a week.

Through his father-in-law, the late August (Gus) Goetz, Jim's familiarity with the company goes back to the beginning (1907), when the company was chartered as California Planing Mill. Gus Goetz retired in 1960 after 53 years with the company.

Jim joined the Purchasing department in 1952, when the company changed its name to Acme Metal Molding. He later became plant manager.

Mr. Kindred has been witness to many changes other than administrative.

He has seen in a short time consumption of aluminum at NAS grow from a few thousand pounds a month to 7 million pounds a year. He has seen the product line grow from storefronts and entrance doors to a broad spectrum of architectural commodities.

He has observed the shaping of technologies, such as extruding and anodizing.

He looks ahead with an uncommon perspective and thinks the use of aluminum is still in its infancy.

He thinks Northrop made a pretty smart move when it selected two going concerns to organize NAS.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Ford, 1961 conv., r/h, w/w, V-8, p/s, p/b, good tires & top, $995 or $200 & take over pymts. L.A. 45, 674-2762. A

Roller Skates, Chicago, shoe-type, size 9, $5. Playa del Rey, EX 1-4860. A

Dinette Set, table & 4 chairs, bronze finish, $25. Inglewood, 677-4540. A

Cadillac, 1953 Fleetwood, 4-dr., air cond., $295. Alhambra, AT 4-5698. A

Live Bait Tank, fibreglass, 20-gal. cap., $17.50. Torrance, 323-0180. A

Chevrolet Impala, 1958, 2-dr. h/top, 348 eng., 3-spd., $550. Gardena, DA 4-0158. A

OLDSMOBILE, Starfire cpe., 1962, full pwr., elec. windows, seat, 48,000 miles, 1 owner, new tires, $2100. Huntington Pk., 589-9503. A

Dining Table, blond oak, drop-leaf style, 40″ wide x 20″, opens to 58″ or 88″ length, $15. Hawthorne, OS 6-0049. A

Refrigerator, 2-dr., automatic defrost, $50. Redondo Bch., 378-1038. A

Socket Ratchet Set, midget w/hand tools, $5. L.A., PL 4-0817. A

Washing Machine, 14-lb. cap., Norge, 1964 model, $125. Anaheim, 828-2440. A

Shop Smith w/accessories incl. blades, cutters, flex shaft cable & chuck, $150. W.L.A., GR 2-2818. A

Golf Clubs, Wilson Middlecoff, $15. L.A., OR 0-1005. A

Air Conditioner, Mark IV for Suburban auto w/mounting, $50. Anaheim, PR 4-2779. A

Hardtop, white, for 1963-65 Corvette, $210. Playa del Rey, 397-6326. A

Oldsmobile Cutlass, 1964, V-8, auto. trans., p/s, p/b, r/h, w/w, $2550. Torrance, DA 9-5364. A

Dishwasher, Lady Kenmore, lge. cap., portable, copper-tone finish, less than 1-yr-old., $140. Torrance, 835-3985. A

Own-Your-Own Apt., near new, 2-bdrm., 2-bath, all elec., pool, hobby room, low taxes & maintenance, $20,500. Gardena, DA 3-2350. A

Camera, Argus C3 w/flash & case, $20. Torrance, FR 1-2705. A

Wedding Dress, full length, straight w/detachable train, size 9, $40. Manhattan Bch., 374-3881. A

Guitar, Spanish classical, nylon strings, instruction books & music, $35. Manhattan Bch., 379-4775. A

Home, 3-bdrm., hardwood floors, 1½ baths, fenced patio, detached gar., $700 dn. pymt. to FHA loan, $17,200. Anaheim, 528-6914. A

Fiat 1100, 1963 4-dr. sedan, $750. Inglewood, 674-8419. A

MG-TF 1500, new top, brakes & clutch, good eng. & tires, wire wheels, low actual mileage, $675. Manhattan Bch., FR 2-0540. A

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Del Amo Blvd. & Paramount, Lakewood. Kathleen D. Plumb, ext. 2605, 379-3968. 2

Ventura Blvd. & Fallbrook, Canoga Park. Veronica Stockard, ext. 1814, 1480, 347-4200. 2

7:30 a.m. — 4:15 p.m.

Calle de Madrid & Colusia, Redondo Beach, Sharon Lynn Seaholm, ext. 1534, FR 5-4860. 3

8 a.m. — 4:45 p.m.

Quail Run Rd. & Donnis, Los Alamitos. W. W. Stark, ext. 1428, GE 1-0843. 5

Balboa or San Diego Fwy. & San Fernando Mission Blvd., Granada Hills. Francis A. Morse, ext. 4221, EM 3-2933. 5

Rides Offered

7 a.m. — 3:45 p.m.

Ventura Blvd. & Fallbrook, Canoga Park. Veronica Stockard, ext. 1814, 1480, 347-4200. 12

7:30 a.m. — 4:15 p.m.

Crescent & Hwy. 39, Buena Park. D. H. Eaglin, ext. 2655, TA 8-2857. 13

8 a.m. — 4:45 p.m.

Quail Run Rd. & Donnis, Los Alamitos. W. W. Stark, ext. 1428, GE 1-0843. 15

Balboa or San Diego Fwy. & San Fernando Mission Blvd., Granada Hills. Francis A. Morse, ext. 4221, EM 3-2933. 15

For Sale

Rug & Pad, 9′x12′ white oval, Karastan, 100% plush pile wool, $135. Hermosa, FR 4-2135. A

Go-Cart, new chassis & engine, $65. L.A., 476-1635. A

Cabin Cruiser, Bryant, 20′ 8″ beam, 50 hp. Evinrude eng., elec. starter & generator, bait tank, sleeps 3, Continental trailer, $2200. L.A., PL 6-5775. A

Pickup, 1961 GMC, ½-ton, V-6 eng., low mileage, hvy. duty rear bumper, r/h, 3-spd., $1100. Hawthorne, 676-6980. A

Ping-Pong Table, regulation size, $20. Hawthorne, OS 6-8842. A

Power Mower, reel-type, Sears Craftsman, $30. Hawthorne, OS 5-5574. A

Pontiac Catalina, 1964 conv., auto trans., all power, r/h, $2750. Santa Monica, 393-7464. A

Refrigerator, Admiral, apt-size, turquoise, 1-yr-old, $90. Anaheim, 635-1719. A

Baby Crib w/mattress, $15. Gardena, DA 3-4116. A

Ford, 1957 conv., new top & w/w tires, p/s, p/b, r/h, $500. P.V. Penn., 377-5084. A

Stove, Kenmore Maid-o-matic w/griddle, 5-burner, rotisserie, 2 auto. ovens & broiler, $125. Hawthorne, OS 6-1404. A

Refrigerator, Electrolux, gas, family size, $25. San Pedro, TE 3-9455. A

Washer-Dryer Comb., elec., Lady Kenmore, 5-yrs-old, $50. Hawthorne, OS 5-1860. A

TV, 19″ Zenith, portable, 2-yrs-old, $65. Hollydale, ME 3-2395. A

Volvo, 1963, white, 2-dr., PV544, 24,000 miles, $1395. Reseda, DI 3-3824. A

House Paint, Latex, 2 gals., Dutch Boy ext., white, $9. Walteria, FR 8-4036. A

Bicycle, Royce Union, 3-spd., boy's, full size, w/access., $35. Redondo Bch., 379-7966. A

Range, gas, Gaffers & Sattlers, clock w/timer, $75. Redondo Bch., FR 9-9926. A

Honda, 50cc, extras, 1963, $250. Manhattan Bch., 379-6442. A

Home, 3-bdrm., 2-bath, rumpus rm., fireplace, dishwasher, water softener, patio, fenced yd., sprinkler sys., $27,550. Yorba Linda, 528-2577. A

Furnishings for living room, kitchen & bedrooms & misc. items, $410. Paramount, 630-1997. A

Volkswagen, 1964 sedan, 9000 miles, w/s/w, radio, $1650. Torrance, DA 7-8994, DA 9-9464. A

Ford Galaxie 500 XL, 1963, Cruise-O-Matic, p/b, p/s, r/h, factory air cond., stereo tape, $2100. Gardena, 679-2592. A

Studebaker, 1955 Commander, V-8, 2-dr., stick, $150. L.A. 45, 677-0471. A

Ski Boat, 18′, Chrysler powered, many extras, $3500. Norwalk, UN 5-8863. A

Range, Western Holly, gas, $20. Gardena, OS 5-1660. A

Boat, 16′ Burchcraft runabout, trailer, recently o/hauled, 85-hp Merc 800, new 100 amp bat., bait tank & pump, compass, many access., $700. Gardena, DA 3-9003. A

Gym Set, top bar, tubular steel, 9′ long, 2″ diam., $10. L.A., PL 5-7521. A

Chevrolet Bel Air, 1957 2-dr. h/top, record player, new trans., tires & chrome reverse rims, 50,000 orig. miles, $975. Hawthorne, 371-0194. A

Telescope, 8″ Newtonian, 1/17th wave, 3 eye pcs., acro Barllow hvy. prof. mount & clock drive, $1000. Rolling Hills, FR 7-2685. A

Scuba Gear, Voit single-stage, U.S. diver's 2-stage w/J-valve, constant reserve tanks, $130. Hawthorne, 676-4251. A

Camera, Argus C4 w/case, $25. L.A. 45, 670-2564. A

Jeepster, 1951, 4-cyl. o/d, r/h, smog device, new top, curtains & battery, $450. Harbor City, 325-0221. A

Ford, station wagon, 1957, V-8, 4-dr., r/h, w/w, p/s, $500. Palos Verdes Est., FR 5-5097. A

Rug, 9 x 11; nylon tuft; black & white speckle, 6-mos.-old, $25. Redondo Bch., FR 6-6415. A

Camera, Polaroid, Model J66 w/elec. eye, leather carrying case, $70. Hawthorne, OS 9-6334. A

Plymouth Sport Fury, 1964, 383 cu. in. torque flite, chrome rims, vibrasonic radio, extras, $2350. Manhattan Bch., 372-4951. A

Headboard, queen size, tropical finish, $20. Pacific Palisades, GL 4-4270. A

House Trailer, 25 ft. long, $500. Lawndale, 675-9389. A

Boat, 16′, cabin wood & glass, 35 hp Elgin, fully equipped, trailer, $425. Torrance, 320-3074. A

Mobile Home, Roadcraft, 50′, w/enclosed cabana, 8 x 35, screens & louvered windows in cabana, 8 x 8 steel storage room, $4500. Gardena, 329-5879. A

Chevrolet, 1954 tudor, $150. Inglewood, OR 1-1660. A

Step End Table set, dark fruitwood, leather tops, $20. Torrance, DA 6-5457. A

Movie Camera w/auto. projector, used twice, 8mm turret lens, $100. Reseda, 343-6948. A

Camper, 1964, Corvair 95 Greenbrier, 4-spd., 21,000 miles, fully equipped for 2, $2450. Hawthorne, 675-9557. A

Range, gas, 30 in., Hardwick w/no-fog window, auto. oven pilot & broiler, less than 2 yrs., $75. Wilmington, 835-2328. A

Cad., 1956, 2-dr., 2-tone blue, good tires, full power, $600. L.A. 45, 645-8278. A

Falcon, 1960, 4-dr., sed., auto. trans., r/h, w/w tires, $595. Torrance, DA 5-3724. A

For Sale

Surfboard, Bing, 9 ft. 7 ins. long, 4 stringers, $90. Encino, 987-2047. A

Bicycle, boy's 26″ racer, $15. Inglewood, PL 5-4497. A

VW roof rack, oak slats, $15. L.A., 478-5732.

Carbine, M-1, 30 cal., $50. Manhattan Bch., FR 2-3878. A

Acreage, ½ acre Oregon river front lot, $1495. San Pedro, TE 3-9118. A

Engine, Corvette 6, 1954, solid lifters, Carter side draft carbs, tri-log alum. manifold & dual headers, need new rings, $150. South Gate, 569-2261. A

Wanted to Buy

Maternity Clothes, size 12. Palos Verdes, 377-4616. B

Plastic Pool, approx. 12′ to 15′, 4′ deep, must be reasonable. Box 701. B

Ford, Chevrolet, Plymouth or Dodge, 1953-1958, that needs mechanical repair, price must be reasonable. Inglewood, 755-1071. B

Cabinet, redwood, approx. 6x6. Hermosa Bch., FR 2-6556. B

FREE (To Be Given Away)

Kittens. Hawthorne, 676-7746. D

Rentals Offered

Apt, deluxe, 1-bdrm., built-ins, pool, $90 mo. Redondo Bch., 376-2117. E

Cabin, Green Valley Lake, $35 weekend, $65 week. Torrance, 320-2002. E

Apt, 2-bdrm., unfurn., close to schools, churches & shopping center, $115 mo. Torrance, 323-6231. E

Apt, 1-bdrm., unfurn., built-in stove, closed gar., laundry facilities, $85-$89 mo. Torrance, 320-1005. E

Apt, 2-bdrm., deluxe, furn., lge. pool & patio, near El Camino Col., $135. Torrance, DA 9-5986. E

Apt, 1-bdrm., garage, unfurn., near Cabrillo Beach, $80 mo. San Pedro, TE 1-3483. E

Apt, unfurn., 2-bdrm., pool, built-ins, $115 mo. Torrance, 323-1946. E

House, 2-bdrm., unfurn., children ok, 10 min. from Northrop, $120 mo. Gardena, DA 9-9621. E

Studio Apt, 3-bdrm., 2-bath, owner's unit, forced air heat, pvt. patio, closed gar., hobby shop, 2 children ok, $165 mo. Torrance, FR 5-0867. E

Cabin, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/ children, $30 weekend, $80 wk. P.V. Est., FR 7-3888. E

Apt, 2-bdrm., near ocean, $155 furn., $140 unfurn. Santa Monica, EX 3-7067. E

House, 2-bdrm., in rear, 1-car gar., parking, disposal & thermo heat control, adults, $100. Pico Rivera, 692-9991. E

Duplex, 2-bdrm., pvt. yard, enc. garage, trash & water paid, adults, $95. Inglewood, OR 7-2448. A

Apt., 2-bdrm., unfurn., built-ins, patio, $115. Hawthorne, 676-5622. E

Apt., 3-bdrm., 2-baths, walk-in closets, soundproofed, patio, forced air heat, carport, $185 mo. Hawthorne, 839-5086. E

Studio Apt., 2-bdrm., 1½ baths, built-in range, hot water pd., furn. or unfurn., 6 blocks to Norair, $130-$160. L.A. 44, PL 5-7854. E

Apt., close to schools, transportation, 2-bdrm. $95; 3-bdrm. $118 mo. No. Long Bch., 422-6169. E

Apt., owner's duplex, 4-bdrm., 1¾ baths, 1-yr.-old, lge. backyard, 2 blocks to school, walking dist. to Centinela Pk., lease, $195 mo. Inglewood, 673-4274. E

Apt., unfurn., deluxe 2-bdrm., 2-bath, fireplace, laundry serv., free hot water, near Norair, $135 mo. Hawthorne, 679-1358. E

Apt., 2-bdrm., 1 block from Norair, $120; 2-bdrm., furn., $135. Rolling Hills, FR 7-4926.

House, 1½ bdrm., furn., ½ block from ocean, gar., references, $130 mo. Manhattan Bch., FR 4-5028, FR 9-8700. E

House, 2-bdrm., natural wood cabs., close to all shopping & schools, tile bath & kitchen, pvt. gar. & patios, fenced yd., $110 mo. Lawndale, OS 9-8426. E

Rentals Wanted

Apt, 2-bdrm., unfurn., in Westchester, $120 mo. Hawthorne, 675-2027. F

Experienced boat operator wishes to rent a trailered power boat, 16x18, adequate power for skiing for wk. in May or June. Torrance, 378-8181. F

Personals

We Wish to express our thanks & the warm welcome of friends. The expression of sympathy at a time when it was deeply appreciated in the passing of Glen A. Smith, my husband, & father of Glen, Jr. & Tim Smith. MRS. GLENN A. SMITH. L

Ironing in my home, $1 hr. Hawthorne, 675-6291. L

Woman w/1 child share 3-bdrm., 2-bath home w/single or woman w/1 child, lge. fenced yard, 5 minutes from Norair. Gardena, 323-3245. L

For Sale or Trade

Honda, 305 Dream, 1964, take over $32 mo. pymts., $546 bal., or trade for old Triumph BSA or dirt bike. Redondo Bch., FR 9-9986. M

Chain Saw, 20″ lightweight, $100 or trade for early model 74 Harley motorcycle in running condition. Gardena, OS 5-2159. M

Apt., 4-unit, Fullerton State College district, $61,500 or trade for lg. lot or more units. Buena Pk., TA 8-2857. M

DR. HICKS PREDICTS NEW GROUP IMPACT

Nortronics Division's new Applied Research department at Ventura will "have an impact on all departments," Dr. Donald Hicks, head of the Ventura-based operation, said at the recent meeting of the Nortronics Management Club, held at the Elk's Club in Long Beach.

Dr. Hicks was the guest speaker at the dinner-meeting. He was introduced to the 170 attending members of the Club by Fred Stevens, Nortronics general manager.

"We have been in operation for three years," Dr. Hicks said, "and it was a natural evolution for us to come to Nortronics. We found ourselves involved in considerable research which fitted in with Nortronics' capabilities."

"This research effort was originated to support new products for the Ventura Division," Dr. Hicks explained. "But as we proceeded, our research capability began to fit more with the Nortronics effort."

Dr. Hicks will be joined by a team of 40 specialists in nuclear effects who report to him at the Ventura Division.

REVIEW BOARD

(Continued from page 1)

members often provide many answers quickly," Mr. Weishaar said. "And we can call in additional men for consultation, if needed."

Often the Review Board will have several vendors stage demonstrations before deciding on a piece of equipment.

It may also remove equipment from service that fails to meet standardization or is worn, damaged, or obsolete. Conversely, they may request the reactivation of equipment from storage, if requirements dictate.

Quality Assurance administers the Nortronics Division equipment program. First, incoming equipment is calibrated and checked, then assigned to the using function. Or it may be retained in a central location to be withdrawn as needed.

"This system is likened to a metropolitan library with many branches," Mr. Weishaar said. "If a branch does not have the item, it can be obtained from the central unit."

Toward this end Nortronics maintains an up-to-date catalogue of all test and inspection equipment showing its location and capabilities. This is available at all times to engineers and technicians who may plan a test program around available equipment.

FOR SERVICES RENDERED—David Kessler (left) of Nortronics presents plaque to Commander Glenn Estes jr., officer-in-charge, U.S. Naval Fleet Missile Systems Analysis and Evaluation group, for his support of the Contractor Advisory Board of the Interservice Data Exchange Program.

IDEP: Northrop Praised For Data Exchange Work

(Continued from page 1)

in government programs. Participating agencies prepare IDEP summary forms on their test findings which are distributed throughout the IDEP system along with microfilmed copies of the complete report.

Each participating firm normally receives about 100 times as much input from the system as it generates.

As Corporate Reliability Data coordinator for IDEP, Mr. Kessler acts as a coordinating point for both incoming and outgoing Northrop material.

Reliability Data Exchange representatives for the Northrop IDEP include: Mr. Kessler (Nortronics-California), John Puerta (Norair), Gordon Cawood (Nortronics-PPD), Art Shaw (Ventura), Eugene Smith (Nortronics-MED), and Dr. William Cox (NSL).

Government acclamation of the IDEP effort is evidenced in letters received at Northrop recently. Captain E. I. Malone, writing for the Bureau of Naval Weapons, lauded the recent conference, praised Mr. Kessler for his part and added a special word of thanks to Northrop for its part in the program.

"Through the media of IDEP, many contributions have been made to the Navy's R&D effort in guided and ballistic missiles and related weapon systems," Captain Malone wrote. "It is gratifying to have the cooperation of company and corporate management in this voluntary data exchange program."

Colonel Clifford R. Silliman, chief of the Air Force Space Systems Division Technical Requirements and Standards Office, also lauded Mr. Kessler's work, Northrop participation and benefits from the IDEP program.

"Though operating without charge to the U.S. Government, the IDEP program has made significant contributions to R&D programs accomplished for the Department of Defense during 1964," Colonel Silliman wrote.

"Budgetary restrictions demand that these policies and procedures remain on a voluntary basis. However, continued efforts by members of the Contractor Advisory Board commensurate with excellent corporate support as demonstrated by Northrop Corporation will enhance the progress and future of IDEP."

Norair Selected By U.S. Navy For Condor Task

Northrop Corporation is one of two contractors selected by the U.S. Navy to perform the Project Definition phase of Condor, a short-range air-to-surface missile.

Work will be carried out at Northrop Norair under a firm fixed price contract in the amount of $675,000 representing initial funding.

Condor is planned to be rocket-powered and will have a high explosive warhead. It will use television guidance to provide carrier pilots with an earlier launch capability and improved accuracy of strikes. Condor is planned for use with the A-6A Intruder.

The Condor program is under the technical direction of Naval Ordnance Test Station (NOTS), China Lake, California.

D. D. Warner has been named Norair Division program manager.

NRC SLOT CAR RACE TRACK READY TO GROW, GROUP SAYS

All of you "racing bugs" who "think small," NRC has something that might interest you—a spanking new Slot Car Racing Club.

At present it is a club in name only, but that will be rectified May 26 when a second organizational meeting will be held at 7:30 p.m. in the NRC Clubhouse — Hawthorne. Officers will be elected and final club plans mapped.

Biggest assets the organizers have are enthusiasm and a special area NRC has made available in which to build a slot car racing track. Work parties are now being planned for weekends and evenings to turn the area into a racing set-up that meets model car racing regulations.

Meanwhile, carpenters, painters, and electricians, are needed to lend a hand.

Further information is available by attending the May 26 meeting or by contacting Sandra Geldert, secretary, at ext. 2351, Norair.

NRC ROUNDUP

Campers, Anglers Plan Big Outdoor Outings

Ah, those May weekends—sun on the water, gentle breezes and the great outdoors!

Sound like your "cup of tea"? Then lend an ear to what is offered Nortronics and Norair folk through NRC activities on tap for the next two weekends.

First, there is a boat and shore fishing excursion to the Salton Sea sponsored by the Northrop Surf Fishing Club. It will be May 21-23.

Then on the long Memorial Day weekend the Camping Club plans a big campout at Lake Casitas in Ventura County.

The Surf Fishing Club plans to kick off its May 22 activities at the impossible (except to fishermen) hour of 4 a.m., terminating competition at 10 a.m. Events will feature awards for adults and novice anglers of many types.

Headquarters for this event will be the Salt Creek Campground at the Salton Sea. (That's on the east shore.) Pre-registration for competition is possible at Red's Bait Shop, 725 North Pacific Coast Highway.

Area "Z" at Lake Casitas has been reserved for Camping Club members. Total cost is $2.25 per day per vehicle. Swimming and water skiing is not permitted, but fishing is described as "fabulous."

Blood Donors Add 206 Pints to Bank

Volunteer donors from Northrop's Hawthorne complex (Norair, Nortronics and NSL) increased the Northrop Blood Bank credit by 206 pints May 11.

First shift employees from all departments were solicited to provide sufficient donors.

May 11 totals should be sufficient to maintain an "in the black" credit until the next scheduled bloodbank visit in September.

Blood credited to the Northrop account is available to all Northrop employees and their immediate families without charge anywhere in the United States.

Contact Personnel Activities offices for information on this special service to employees and families.

BATES

(Continued from page 1)

lin, Norair manager of Quality Control.

Norair's Medical section gave him the same rigid physical required of all who ride aboard Northrop jets and he passed with flying colors.

His supersonic flight lasted 35 minutes and found him highly excited at breaking the sound barrier.

Prescription Glasses Available at Discount

Regular prescription or safety prescription glasses are now available to Nortronics (Anaheim) folk at industrial rates, Safety Engineer Bill Cornett reports.

Arrangements have been made with a local firm to provide this service. Interested employees may check the Safety office.

NORTHROP PLANE WOWS VETERANS

Superlatives were heaped on Northrop's leased F-5B last month as it carried out a whirlwind 18-day demonstration flight program at Hickam AFB, Hawaii.

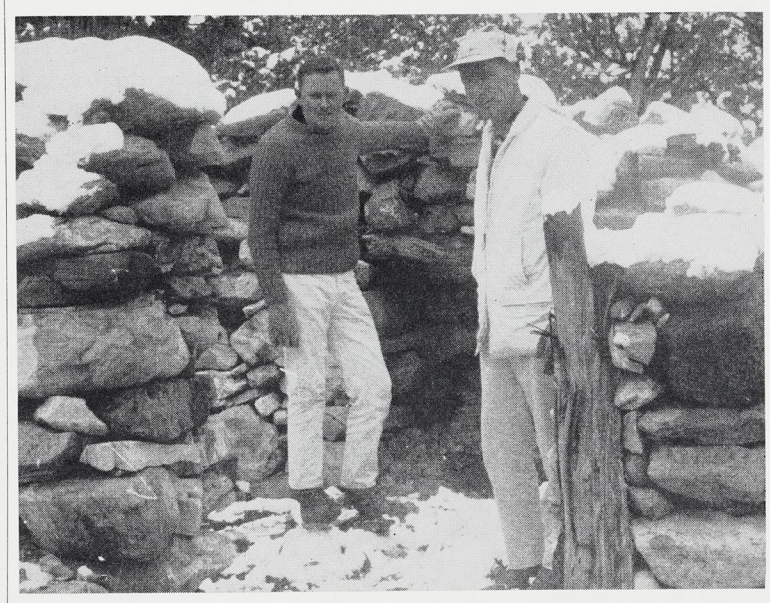
They came from knowledgeable and experienced United States Air Force, Navy, Army and Marine Corps pilots, plus others from foreign nations, who took part in the 86-flight effort.

An all-Northrop team carried out the demonstration program which averaged 4.8 flights per day during the period.

Post-demonstration comments covered many subjects with the officers commenting favorably on the F-5B's outstanding stability, simplicity, responsiveness, rate of climb, visibility, cockpit arrangement, controls, single-engine performance, maneuverability and over-all safety features.

One officer summed up the feelings of many when he noted: "The performance is truly amazing and flight characteristics are so superior they must be experienced before a pilot can appreciate them."

DESERT SNOW RATS



John Luzar and Jim Pepperall, members of Nortronics (Anaheim) Desert Rats, stand in front of snow-covered ruins of house in Panamint City, Death Valley. Snow forced NRC campers to move to new location recently during one of regular scheduled outings.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 8 | June 2, 1965

Nine Months Income Tops $6.1 Million

Northrop had consolidated net income of $6,136,000 for the nine months period ended April 25, 1965, compared with consolidated net income of $4,679,000 for the same period a year ago, according to Thomas V. Jones, president and chairman.

The nine months' earnings are equivalent to $1.50 per share on the 4,097,939 shares outstanding at April 25, 1965. This compares with per share earnings for the first nine months of the last fiscal year of $1.15 on the 4,081,522 shares then outstanding.

Consolidated net sales for the first nine months totaled $255,894,000, compared with consolidated net sales of $219,252,000 for the same period a year ago.

Consolidated net income for the quarter ended April 25, 1965, was $2,116,000, equivalent to 52 cents per share of common stock, compared to last year's third quarter consolidated net earnings of $1,405,000, equivalent to 34 cents per share.

The company's backlog of sales was $314,000,000 at April 25, 1965, as compared with approximately $340,000,000 in backlog a year earlier.

At the regular monthly meeting, the company's directors declared a quarterly dividend of 25 cents per share, payable June 16, 1965, to shareholders of record June 2.

Condemnation Suit Dropped by State

The State of California has dropped its legal action to condemn 52 acres of Northrop land in the Nortronics Research Park at Palos Verdes. The State has been seeking to acquire the property as part of its site for the proposed South Bay State College.

The condemnation suit was withdrawn, according to State sources, because the legislature has not yet appropriated sufficient funds to acquire the total college site.

In dropping the suit, however, the State gave no indication that it intends to abandon its plans to locate the college on the Palos Verdes Peninsula.

VIGICON AT NAVY LEAGUE

The Honorable Paul H. Nitze, Secretary of the Navy (right), views Northrop Nortronics exhibit at Navy League convention in Washington April 20-24. Nortronics Senior Applications Engineer Chuck Blaney (center) describes Vigicon Real Time Display equipment to Secretary Nitze and the Honorable Robert W. Norse, assistant Navy Secretary for Research and Development. Vigicon systems are used at key U.S. command and control centers.

IN JEEPS, STETSONS

Ordnance Men at Home on Range

Supervisor Earl Chambers and the six test engineers who work with him at Nortronics have one of the world's largest laboratories —the Great American Desert.

As members of the Ordnance Laboratory unit at Anaheim, they pick their spots to conduct experiments by the square mile. Their addresses vary from "somewhere in the Yuma mountains" to "somewhere in the Mojave desert."

Their trademarks are wide-brimmed stetsons and four-wheel-drive vehicles.

Their job is developmental testing of a diverse arsenal of weapons which Nortronics produces for all branches of the Armed Forces.

Currently assigned as test engineers are Jim Hock, Ray Harr, Dick Sloane, Chuck Stevens, John Johnson, and Del Mott.

Although most of their work is of a classified nature, the field crews can usually come up with an interesting story about their outings. Even talking about the weather is full of new twists.

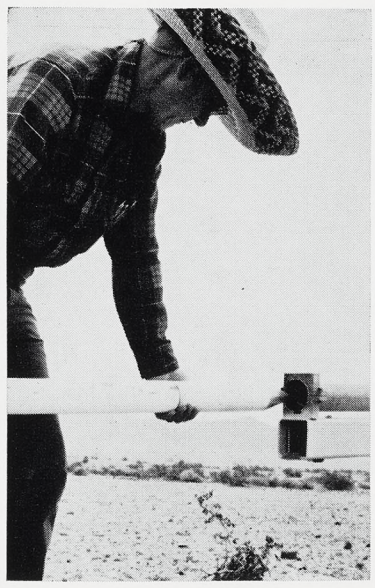
On a recent experiment conducted in a corner of Camp Irwin Military Reservation in the Yuma Mountains, a crew headed by Mr. Hock experienced snow, rain and 100 degree temperatures in one trip.

They may go into a site along a dry trail one morning and discover upon exiting in the evening that the road runs into a mile-wide lake. More often than not, there's no trail at all, and the engineers navigate by compass and the sun.

Ordnance Lab personnel have their built-in physical fitness program, too. Setting up a test program requires a week of rugged activity, 90 percent of which is pure physical labor.

After a test is set up, however, the brainwork begins.

The men take all the laws of the laboratory with them to the field, and they set up a range to precise specifications. A photographer is usually along to take high speed movies, from which much of the weapon's performance data is taken.



Ordnance Test Engineer Jim Hock, in full field uniform, prepares to fire one of Nortronics-developed weapons.

But the volume of data which the crew brings back is more than just successful or unsuccessful firing. Using specialized instruments, the crew attempts to determine such parameters as stress, pressure, velocity, and exposes each component of the weapon to operational environments.

After determining such factors as possible applications of the equipment, their attention turns to cost effectiveness. Their field feasibility tests usually influence design changes.

Needless to say, all their work is performed with maximum consideration for safety on government-assigned testing ranges.

BENEFITS INCREASE FOR 13,000

Approximately 13,000 Norair, Nortronics and Northrop Space Laboratories employees in Southern California will share in pay increases and other new benefits amounting to more than $1.5 million annually.

Details of both wage increases and new benefits were revealed late last month by Thomas V. Jones, Northrop president and chairman.

Mr. Jones indicated increased pay and other benefits were established in conformance with Northrop's continuing policy of maintaining compensation levels that compare favorably with those prevailing in the industry and in this geographical location.

Paychecks to be distributed June 11 to some 5873 hourly-paid employees will include pay increases ranging from five to ten cents per hour. Merit increases for salaried personnel will continue to be made from a fund maintained for that purpose.

Both hourly and salaried employees will enjoy new vacation, insurance and retirement benefits beginning August 1.

They include such new benefits as extended vacation privileges for employees with 10, 20 and 25 years' seniority; increased group insurance benefits for hospitalization and major medical coverage; and more liberal insurance provisions for retired personnel.

Northrop Norair employees in the Hawthorne complex, Palmdale and Edwards Air Force Base are included as well as Northrop Space Laboratories employees and Northrop Nortronics employees at Hawthorne, Palos Verdes and Anaheim.

Complete details covering both wage increases and other new benefits are available for review by all employees through their department supervisors.

HISTORIAN OR A JUNK COLLECTOR? IT DOESN'T MATTER TO RANDY LEE

Randy Lee started out 30 years ago to compile a family scrapbook and then got carried away.

Last week he took a quick tally and counted 350 scrapbooks, plus about 100,000 items yet to be catalogued. Enough, he reasons, to fill another 100 scrapbooks.

What's in them all?

Some say it is potentially valuable information. Others call it junk. It probably depends upon your outlook.

Randy, a Nortronics (Anaheim) Machine shop heavy equipment operator for the past 10 years, is rather proud of his role as "father" of it all. He also laughs good naturedly at other's opinions.

"I may be crazy or a contributor to history," he grins, "so who cares as long as I enjoy it."

Randy's hobby is clipping, sorting and pasting just about anything that catches his fancy. He now has some 64,200 clippings, 3924 photographs, 575 postage stamps, 1656 postcards, 691 pieces of money, and a flock of other items ranging from negatives and slides to no-longer-published mag-

(See HISTORIAN, page 6)

Desert Test Boosts Faith In Apollo Recovery System

National Aeronautics and Space Administration officials have expressed more confidence than ever in the Apollo escape and recovery system, after the equipment was put to an unscheduled, spectacular test at White Sands Missile Range, New Mexico, May 19.

NASA credited the Northrop-built parachute recovery system with playing a key role in successfully landing a test version of the Apollo spacecraft after a Little Joe II booster exploded after 25 seconds of flight.

The original test plan provided for the boilerplate, unmanned version of the Apollo spacecraft, to be rocketed to an altitude of 33 miles by a Little Joe II booster. When the booster broke up after 25 seconds of flight, the escape and recovery system went into action automatically and functioned perfectly.

The boilerplate Apollo was landed intact three miles from the launch pad beneath the three 83-foot orange and white main parachutes developed and manufactured by Northrop's Ventura Division.

"That was the prettiest bunch of silk I've ever seen," commented astronaut Donn Eisele, who one day may be scheduled for a lunar flight aboard an Apollo spacecraft.

Another astronaut, Richard F. Gordon, said "From this event today, I feel great confidence in the escape and recovery system."

Dr. Joseph Shea, NASA's project director for Apollo, said the premature breakup of the booster apparently was caused by a faulty

(See APOLLO, page 6)

General Hamilton Howze, commander of U.N. Forces, Korea, inspects ROK F-5 (above), accompanied by U.S. Ambassador Winthrop G. Brown (center) and Northrop Senior Vice President Robert R. Miller. General Howze told listeners at last month's ceremony in Seoul that "the F-5 can match any jet aircraft in the world today." Mr. Miller (below) presents model of F-5 to Republic of Korea President Chung Hee Park.

Air Force personnel attached to U.N. Forces in Korea instruct ROK Air Force ground crews on maintenance of F-5 (below) while, at another plane in new Korean squadron, ROK pilots are checked out on controls (left).

NORTHROP FIGHTER WAS MET IN KOREA BY TOP U.S., ROK OFFICIALS WITH PUBLIC TESTIMONY OF F-5'S CAPABILITIES . . .

Northrop-built F-5's display ROK markings for first time.

. . . AND IN HAWAII, THE F-5B SET THE ENTIRE PACIFIC TALKING ABOUT VERSATILITY

Chatting between flights during Hawaiian F-5 demonstration tour are (above, from left) W. E. Woolwine, Bob Purcell, Monty Montgomery and J. A. Moise. Lieutenant General Tom S. Moorman (photo at right), vice CINCPAC, was one of 86 riders. At left, group waiting for John Fritz (in cockpit) to take off includes (from left): Dan Darnell, Colonel Gus Julian, Earle M. Jorgensen of Northrop Board, and Mr. Jorgensen's son, John.

AIAA Names 36 Technical Committees

The American Institute of Aeronautics and Astronautics has announced the appointment of new chairmen and members of 36 technical committees, which include seven Northrop employees.

At the same time Senior Vice President Richard E. Horner was named to the Technical Activities committee, which provides overall coordination of the technical committee programs. Mr. Horner is also national president of AIAA.

Win Arata of the Corporate Marketing staff, who has been nominated for chairman of the Los Angeles section of the AIAA, now heads the national Marine Systems committee.

Theo Knacke of Northrop Ventura's Paradynamics section is a charter member of the Aerodynamic Deceleration Systems committee, one of two new committees established this year. The other newcomer is History of Astronautics and Aeronautics.

Other Northrop appointees include:

—Robert E. Malm of Page Communications Engineers, Inc., named a member of the Communications committee.

—William B. Fallis of Norair, named a member of the Entry Vehicles committee.

—Norman P. Laverty of Nortronics, named a member of the Guidance and Control committee.

—Milton Beilock of Northrop Space Laboratories, named a member of the Spacecraft committee.

—Milt Kuska of Norair, named a member of the Management committee.

In its announcement of the appointments, the AIAA termed the 36 committees "the backbone of the AIAA" and added that "membership in them indicates the individual's eminence in his professional specialty."

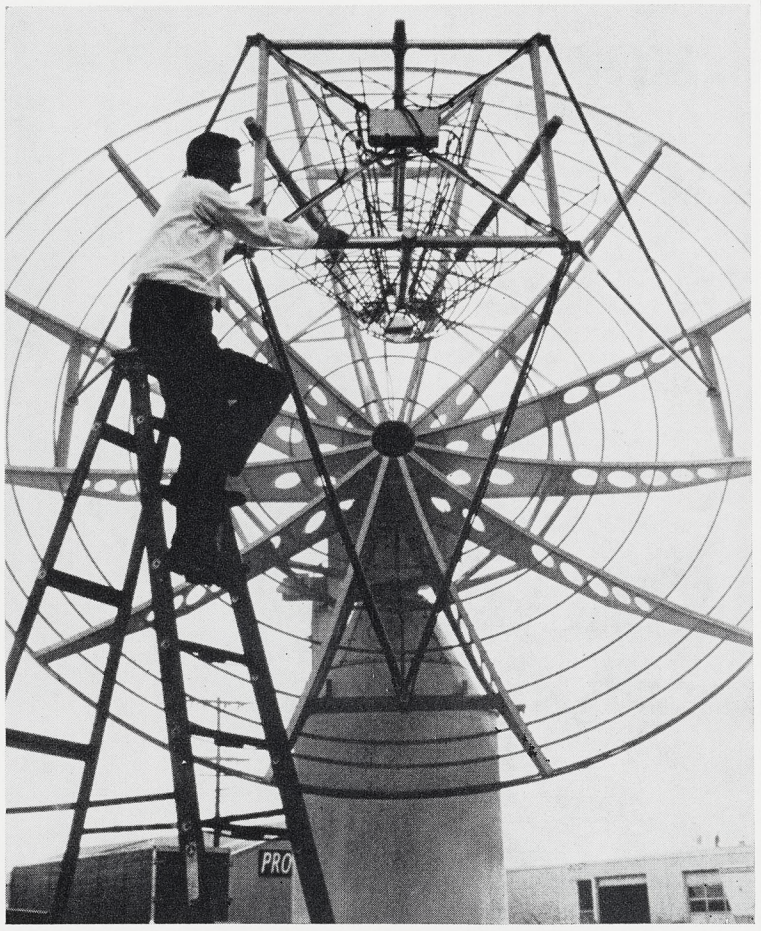
NORTHROP NEWS

Vol. 23 No. 8

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

ONE FOR THREE



New tracking antenna that does the job of three is manufactured by Astro Technology Corporation, West Coast subsidiary of Page Communications, Inc. Astro Tech's vice president and chief engineer, Bob Smith, is making adjustments. Page is wholly-owned subsidiary of Northrop.

Medal of Honor Winner Revisits Scene of Heroism

"The last time I was through here the whole city was a deserted, smoking rubble," Ray Harvey said as he pointed to the sparkling clean, modern city, dotted with high rise offices and apartment buildings and bustling with 2.4 million people.

Mr. Harvey, of the Corporate Customer Relations staff, was in Seoul for ceremonies which officially made the Northrop F-5 a part of the Republic of Korea air defense.

He was also a special guest of the U.S. 7th Infantry Division in which he served during the Korean conflict.

Seoul was being leveled by Communist troops when Ray joined the 7th Infantry in 1950. When the Bayonet Division moved into the combat zone a few weeks later, he commanded C Company, 17th Infantry Regiment.

As the United Nations Forces pushed northward during the months of bitter fighting in 1950, Company C was the first American unit to reach the Yalu River.

But it was on the second U.N. drive in March 1951, near the 38th parallel, that Mr. Harvey was severely wounded in a hilltop action which earned him the Congressional Medal of Honor.

During his visit last month, he was honored at a special retreat and was made a lifetime member of the Society of the Bayonet Division. In touring Division facilities, Ray learned that an indoor shooting range had been dedicated to him and an officers' quarters (Harvey Hall) had been named after him.

Earning the Medal of Honor was both the climax and end of Mr. Harvey's combat career, even though he remained in the Army until 1961 when he retired as a lieutenant colonel.

He was commissioned in 1942 after graduating from Officers Candidate School and served through five campaigns in Europe during World War II.

Other decorations include the Distinguished Service Cross, Silver Star with two Oak Leaf Clusters, Bronze Star with one Oak Leaf Cluster, Purple Heart with two Oak Leaf Clusters, and the Chung-Mu Distinguished Service Cross with Gold Star awarded by the Korean Army.

HERO'S RETURN—Congressional Medal of Honor winner Ray Harvey, now a member of Northrop Customer Relations staff, reviewed troops and presented citations to members of 7th Infantry Division in Korea last month. Mr. Harvey served with 7th during Korean conflict.

Page Completes Pacific System

Page Communications has completed another communications installation for the U.S. Air Force ahead of schedule.

Ribbon cutting ceremonies were held recently in the Philippines by officers from Clark Air Base and Joseph A. Waldschmitt, president of the Northrop subsidiary.

As designers and managers of worldwide communications systems, Page has built networks which span the Pacific to bring Far East locations into instant contact with the United States and Europe.

Ham Operators Seek Global Northrop Net

Northrop Recreation Club ham radio operators, "in order to foster the Northrop family spirit," have taken steps to establish a worldwide communications network as a joint club project.

Employees of Ventura, Nortronics and Norair divisions, Northrop Space Laboratories and Page Communications Engineers, Inc., have responded to date.

Radio Club commissioner at Anaheim, Paul Staudenmayer, first presented the idea to clubs at Northrop Ventura and in the Hawthorne complex.

While Page Communications has no active club, it has ham operators in Washington, D.C., Hawaii, Midway, Guam, and throughout the Pacific where the Northrop subsidiary builds and maintains communications equipment.

The recently-organized club at Ventura has just installed equipment and is already making regular contact with Anaheim on a temporary schedule, according to Commissioner Bob Holly.

Hawthorne's Club is in the net through personal car radios, Commissioner Claude Moffett of Nortronics (Palos Verdes) said. Palos Verdes employees make up about half the membership of the Hawthorne Club.

In the absence of Club equipment, the Hawthorne group is concentrating at present on code classes and helping members build up their own sets, Mr. Moffett added.

"We have yet to work out operating times, frequencies or schedules," Mr. Staudenmayer said. "Our present emphasis is on locating and identifying Northrop amateurs."

One of the first steps proposed is the compiling of a Corporate-wide log carrying the names and call letters of all known amateurs. The log will be reproduced and distributed soon and updated periodically, he explained.

The net might also be used to handle personal messages from employees who are temporarily away from home on company business, Mr. Staudenmayer said.

Meanwhile, Mr. Staudenmayer would welcome information and comments by mail from interested amateurs. Or, the Club is on the air at Anaheim from 7:30 to 8 a.m. and from 11:30 a.m. to 12:30 p.m., Monday through Friday. Call letters are WA6YNT, operating on from 2 to 80 meters, mostly single sideband at 20 meters.

AF Cross Winner, Viet Nam Veteran Impressed By F-5

Lieutenant Colonel James R. "Robbie" Risner, one of the most distinguished U.S. Air Force pilots flying combat missions in Viet Nam, was a Norair visitor recently.

Colonel Risner spent most of two days in technical discussions with Norair officials. He also made two flights aboard an F-5B piloted from Edwards AFB by John Fritz, chief of Flight Programs, OPINDOC, and was reported to have been "very favorably impressed with the F-5 capabilities."

General J. P. McConnell, Air Force Chief of Staff, recently recalled Colonel Risner from Viet Nam to award him the Air Force Cross, second only to the Congressional Medal of Honor.

His award was for "extraordinary heroism" in leading an F-105 squadron against North Viet Nam targets despite the fact his aircraft was heavily damaged by anti-aircraft fire.

Colonel Risner was the cover subject on a recent (April 23) issue of Time magazine. He commands the Air Force's 67th "Fighting Cock" Tactical Fighter Squadron based at D'Anang.

He was credited with shooting down eight MIG's during the Korean conflict.

Venturan Graduates

Bernard W. Montag jr., Northrop Ventura controller, was among Los Angeles area businessmen completing the fourth annual Managerial Policy Institute in the USC Graduate School of Business Administration which ended May 10. Participants attended 30 weeks of evening classes.

HAM ON AIR—Marty Gregor (left) and Vaughn Peak of Nortronics (Anaheim) attempt contact with Northrop Ventura amateurs as first link in proposed Northrop-wide, worldwide communications net.

Northrop's Junior Achievers Profit From Taste of Business

It was a profitable year for the five Junior Achievement firms sponsored by Northrop divisions in 1964-65 even though, dollar-wise, not all were able to pay a dividend to shareholders. The profit to all came in the knowledge gained by the young participants as to how the American economic system really works.

As Rollie Pontious, Junior Achievement coordinator for the Norair Management Club, put it:

"As achievers come of age, they will guide the destiny of millions of future Americans . . . Their good judgment and wisdom will be needed in maintaining a prosperous nation."

Norair Management Club sponsored two firms this year. Nordesco, Inc., manufactured a pencil caddy; Norcraft, Inc., manufactured an emergency blinker light for stalled vehicles.

Conejo Designers and Producers, sponsored by Northrop Ventura made the top showing of the year among the five. The firm last month announced a 92 percent return on investment to shareholders, and was honored May 13 at the annual J-A banquet at Hollywood Palladium for placing fourth in competition for Company-of-the-Year in Southern California.

The words of Jeff Zizzi, president of Nortronics-sponsored Arbeit Company, are more repayment than Northrop counselors could ever receive elsewhere for their efforts.

In his message to stockholders, Jeff wrote:

"This year, although it was not as successful as planned, was successful in ways other than in money. The responsibilities, the procedures, and the organization of a company which we learned can be considered some of these ways. In addition we learned how the free enterprise system works."

In addition to Arbeit, which was sponsored by Hawthorne personnel, Nortronics counselled Descal, Inc., at Anaheim.

EXECUTIVES MEET—Carol Grassman (left), one of 18 Junior Achievement presidents interviewed at Corporate offices last month, signs in with Elizabeth Johnson, Northrop receptionist. J-A leaders were vying for annual Executive Awards.

Nolan Backs J-A as Boon To Free Enterprise System

Hundreds of Southland business and professional people are devoting thousands of hours of their own time each year to the Junior Achievement program because, as Senior Vice President Dick Nolan put it this week, "they believe it is one of the best ways to instill enthusiasm for the free enterprise system in young people."

Mr. Nolan's statement was made on behalf of a panel of nine judges which met last month at the Corporate offices in Beverly Hills to present 14 Executive Awards to the top teenage business men and women in Southern California.

Mr. Nolan was host to the group and chairman of the meeting, which involved individual interviews of finalists to determine how well the young candidates had learned to cope with the complexities of modern business.

Executive Awards are made annually at the conclusion of the Junior Achievement year, which runs from October to May. J-A firms are liquidated each spring with profits disbursed to shareholders.

According to Mr. Nolan, himself a seven-year J-A veteran, the awards were based on what the young people learned about free enterprise rather than whether the firm showed a profit or loss for the year.

"It was a most refreshing experience to take time out from the complexities of modern business and see the younger generation come to grips at an early age with the free enterprise system," he said.

"So often, young people come into the business world with a good education in theory but have no concept of the reality. The exposure to business realities through the J-A program is one of the best defenses against communism that we have today.

"J-A promotes understanding and creates interest in free enterprise, as well as providing a basic education in what makes our nation's economy tick."

The panel was exposed to some unexpected business realities of its own during the interviews.

Each of the candidates sub-

(See NOLAN, page 5)

SAY, THAT LOOKS LIKE MINE

Major General Clyde Box, USAF (left), commander of Sixth Allied Tactical Air Force, Izmir, Turkey, and Admiral Charles D. Griffin, USN, commander-in-chief, Allied Forces Southern Europe, Naples, Italy, compare F-5 models during the Admiral's recent visit to NATO headquarters in Turkey. Both Greece and Turkey are scheduled to receive F-5's which will support NATO operations in southeastern Europe.

ANAHEIM SHOW TO ATTRACT PETS FROM ALL WALKS OF LIFE

If it walks, crawls, plods, prances, glides or slithers, bring it along June 13 when Nortronics (Anaheim) NRC holds its annual pet show at 2 p.m.

The big event will be held in the NRC area and is open to all Northrop employees and their families.

And the public is invited to attend free.

Trophies and ribbons will be presented in eight categories, including cats, dogs, hoofed animals, fish, birds, and novelty pets. There will be a best-of-show judging and each entry will receive an award.

The Southern California Humane Society will provide judges.

This annual event is traditionally one of NRC's most interesting affairs of the year for both contestants and spectators.

PIONEERS IN PARADYNAMICS: PART I

Slender Thread of Life Is Silken Line

Parachutist extraordinaire Lew Vinson has only one of his nine lives left, so after 24 years and 1090 jumps he's sticking to the ground.

But his life is still hooked to the slender threads of a canopy.

As parachute field test representative for Northrop Ventura, his assignments range from setting up tests at El Centro, California, of Gemini escape systems to fitting astronauts for their personal parachute harnesses.

As for the nine lives, Lew relates that his main chute has malfunctioned seven times since his first jump in 1943. Each time his emergency pack opened at the last minute. On jump 1088 he broke his leg in a rough landing.

To call Lew a pioneer in paradynamics is an understatement. When he retired from the Navy in 1957 as a chief warrant officer, this was a sampling of his record:

—Most jumps in Naval air history which dates to 1911.

—First to test completely automatic aircraft ejection seat.

—With the first group of Navy men to jump from above breathing and subzero temperature height, to test pressure suit. Experiment involved free fall from 32,000 feet to breathing altitude.

—Personally made 755 experimental jumps in research, development, testing and evaluation of pilot safety and survival equipment.

When he joined Northrop in 1957, he went to work on another first—testing the Skysail parachute. Skysail was the first personnel parachute designed and developed for the U.S. Navy by private industry.

Three years later, with the record books still filled with the name Carpenter L. T. Vinson, the fun really began for Lew as he added another chapter to the history of Naval aviation.

He volunteered to return to active duty for organizing training and leading the Chuting Stars, a skydiving team which, in 1961, performed at 41 major air shows in the U.S. and Canada to commemorate the 50th anniversary of Naval aviation.

Performing for crowds too far below to see, the Chuting Stars jumped from 12,500 feet, passed batons or performed acrobatics while falling at 120 miles per hour, and then pulled the ripcord at 2500 feet.

Not only did the Chuting Stars give a special performance for President Kennedy and top Washington officials at Andrews Air Force Base near Washington, they put on a show only a mile from Northrop Ventura at Rancho Conejo Airport.

While there were only 41 air shows, which also featured the Blue Angels, Lew added 265 jumps to his record, counting the training period.

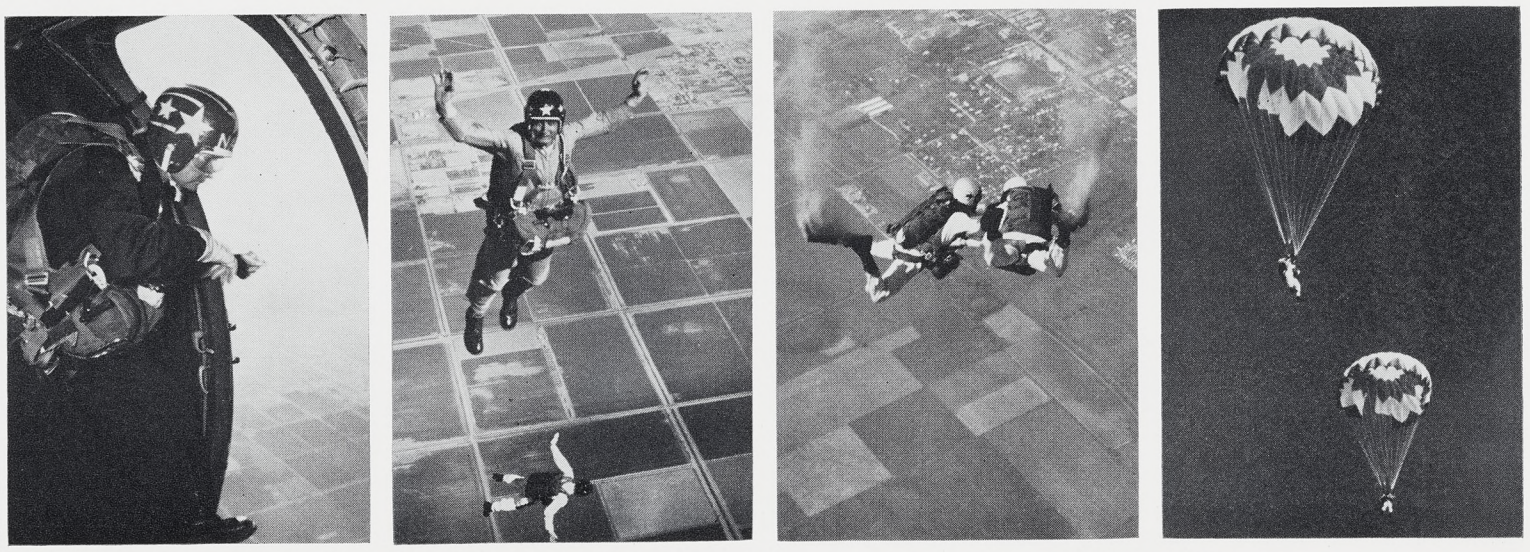
With more than 1000 jumps to keep track of, you might think Lew would have trouble remembering the toughest one. But he will immediately answer: "number 417."

That's because number 416 was three seconds away from being his last, and "it's always hardest to go back up after you've had a close call."

It was in 1952 when Lew was testing a new piece of equipment that his main chute opened, but "streamed," which means it did not inflate with air.

He opened his emergency chute but it got entangled with the main suspension lines.

(See VINSON, page 5)



Chuting Star Jumpmaster Lew Vinson makes like a falling star.

VINSON

(Continued from Page 4)

He was still plummeting at full speed and at less than 1000 feet when he finally worked the reserve chute loose. He came out of that drop unhurt, but he doesn't care to take credit for the fastest 12,000 foot jump.

That same year, while stationed at El Centro, Lew earned the Air Medal for organizing and leading a rescue mission to take medical assistance to a Marine aircraft crew downed on a virtually inaccessible mountainside.

He was decorated again in 1957 for rescuing a helicopter crewman downed at sea.

But Lew's experiences have not all been so somber.

There was the time in Canada when the Chuting Stars were to perform at the Canadian National Exhibition. As usual, the group submitted a list of their requirements to the sponsors.

An unusual addition to this list, however, was a request to have a laundramat open all night for their use. It seems the program called for jumps into Lake Ontario on two successive days.

Since it takes two to three days for a parachute to dry normally, they had to run a whole fleet of automatic dryers most of the first night in order to have dry packs for the next day's show.

The Canadian sponsors almost had to cancel the show, but finally were able to make the necessary arrangements.

When the 1961 tour was over for the Chuting Stars, Lew returned to Northrop Ventura.

For a paradynamics pioneer whose record shows two retirements and more than his share of contributions to pilot safety, Lew is showing no signs of slowing down.

His mind is virtually a databank of paradynamics and his every decision reflects the horsesense that only 24 years and 1090 jumps can develop.

Lew Vinson is one good reason why astronauts in the Mercury and Gemini programs who have been up and came back safely will never forget Northrop Ventura.

NOLAN

(Continued from Page 4)

mitted a written treatise on the year's activities. As a part of the treatise, candidates were required to describe the organization and operation of a hypothetical company.

One crewcut candidate described his hypothetical company as one that produced and sold tropical fish. Complying with treatise format, as outlined by J-A, the candidate penned a classical answer to the requirement to describe the production control department of the make-believe company.

"We didn't have a production control department," he wrote. "There was only so much we could do. Most of it was up to the fish."

He became one of the 14 Executive Award winners.

WEATHER NOT CAUSE

Fog, rain and snow were not major causes of highway accidents in 1964 that claimed 48,000 lives. About 90% of the crashes occurred in clear weather on dry roads, according to an authoritative survey just released by The Travelers Insurance Companies.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Refrigerator, Philco, sep. freezer space, 2 crispers & meat storage drwr., $75. Hawthorne, OS 6-1404. A

Power Mower, King-O-Lawn, $150. Inglewood, 675-0521. A

Sewing Machine, in desk-style cabinet, Dial-A-Stitch control, 3-yrs-old, $100. Inglewood, 677-4540. A

Bicycle, full-size, boy's, hand brakes, 3-spd. Sturmy-Archer, $25, W.L.A., GR 2-2818. A

Range, 4-burner Vista w/Robert Shaw oven, $20. Torrance, 835-3985. A

Bar Stool Set, woven straw seats, metal legs, $30. Manhattan Bch., 379-4775. A

Chevrolet, 1957, new tires & battery, $675. Fullerton, 528-6914. A

Austin Healey, 1958, 4-seater, $850. Manhattan Bch., 379-6442. A

Chevrolet Impala, 1958, 2-dr. h/top, 348 eng., p/s, $550. Gardena, DA 4-0158. A

Volkswagen Camper, 1963, w/tent & stove, 1500 eng., $1750. Inglewood, OR 4-1654. A

Corvette, 1957, hard & soft tops, cam, solids, 4:56 rear end, 57,000 miles, $1300. Manhattan Bch., 371-3436, 372-2336. A

Dishwasher, Mobile Maid, coppertone, 7-mos-old, $100. Torrance, FA 0-1897. A

Cemetery Lot, singles, Sunrise plot, $450. Inglewood, 674-5579. A

Chevrolet Station Wagon, 9-pass., p/b, p/s, p/w, r/h, V-8 eng., $850. Buena Pk., LA 1-4711. A

Dress, formals & cocktail-type, sizes 8 & 10, $10-$15. Manhattan Bch., 374-3881. A

Car Cooler, evaporation floor-type, plugs in cig. lighter, 12 volt, $20. Manhattan Bch., FR 2-6916. A

Buick Electra 225, 1960, 1-owner, many extras, $1095. Inglewood, 679-5979, 672-0312. A

Camera, 4x5 Crown Graphic w/flash gun & solenoid, $125. Hawthorne, OS 5-3866. A

TR-3 Triumph, 1957, needs work, $500. Anaheim, PR 6-2578. A

Table Set, cafeteria-type, masonite tops, $15. Gardena, DA 9-7447. A

C-B Radio, Olson spotter 3, tuneable 23 channels, transmit channels 1, 3, 9, 17, 3-mos-old, mobile ant., $110. Huntington Bch., 714-847-5029. A

House, 2-bdrm., dble. gar., corner lot, sprinkler sys., used brick veneer & planters, remodeled, R-2 zone, 2 blocks from Alondra Park golf course, $17,750. Gardena, 371-6871. A

House, 3-bdrm., 1½-bath, lge. backyard w/ fruit trees, redwood fence, patio w/brick bbq., $17,900. Buena Pk., 828-4388. A

Corvair Monza, 1962, 4-dr., auto., r/h, b/ seats, $1050. Inglewood, OR 7-7364. A

Pups, boxer, AKC, 8-wks-old, fawn & white, $100. Cypress, 714-827-4393. A

T-Bird, 1958 h/top, p/s, p/b, $695. Torrance, DA 9-3286. A

Property, 29 Palms area, 5 acres & cabin w/electricity, fully insulated, $3000. P. V. Pen., FR 8-3448. A

Mobile Home, 10'x50', 2-bdrm., furn., air cond., $2995. Orange, KE 2-1361. A

Plymouth Station Wagon, 1959, 6-pass., push-button dr., $400. Anaheim, 635-1686. A

Trailer, single-wheel, 18.8 cu. ft., covered, hitches & spare tire, 6-volt lights, $100. Santa Monica, EX 4-3345. A

Plymouth Club Coupe, Belvedere, 1955, auto. trans., r/h, $150. Torrance, FA 8-6839. A

Falcon, 1960 2-dr. station wagon, stick, r/h, $550. Redondo Bch., FR 4-2188. A

Table, solid oak, 54" round, w/4 straight-back chairs, $65. Canoga Pk., DI 0-7752. A

Wig, hand-tied, shoulder lgth., auburn, $75. Garden Grove, 714-897-5647. A

Sunbeam Rapier, 1956 deluxe sedan, o/drive, $250. Torrance, FR 4-7987. A

Porsche Roadster 1600S, 1961, $2595. Box 801. A

Organ, Gulbransen Rialto, theatre model, walnut finish, 6-mos-old, $3800. Lomita, 326-6074. A

Chevrolet Impala, 1958, p/s, p/b, V-8, r/h, 2 new tires & battery, $595. Placentia, 528-2166. A

Sprite, 1961, w/radio, tonneau cover, 4-spd. trans., $825. Box 802. A

Corvair Monza 900, 1961, r/h, auto. trans., $925. Box 803. A

T-Bird, 1964, air cond., p/b, p/s, w/w, reclining right seat, auto. trans., $3950. P. V. Pen., FR 7-1466. A

Washer, RCA Whirlpool, $75. Redondo Bch., 372-9757. A

Dryer, Norge deluxe, 14-lb. cap., $150. Fullerton, 349-6330. A

For Sale

Ford Victoria, 1956, 2-dr. h/top, new tires & brakes, $350. Redondo Bch., FR 4-2915. A

Wig, machine-made, blonde frosted, 100% human European hair, 2-mos-old, $80. Inglewood, OR 3-5568. A

Accordion, La Scalla, 120 bass, 7 shifts, 10-mos-old, $300. Lawndale, OS 5-5780. A

Guitar, elec., Gibson, Spanish-type, pen-striped, $125. Inglewood, 757-6960. A

Volkswagen 1500, 1964 2-dr. sedan, 3000 miles, $2200. Hawthorne, OS 6-8816. A

Chevrolet Truck, 1960 ¾-ton, 10' Tuk-A-Way telescopic camper, hand-operated, $1600. Hawthorne, OS 6-8331. A

Surfboard, 8½', glass-covered balsa, $25. Manhattan Bch., 372-6603. A

Piano, apt-size spinet, Wurlitzer, walnut, $250. Gardena, DA 4-9033. A

Corvair Monza, 1962 4-dr., b/s, r/h, 1-owner, $1025. Alhambra, AT 4-5698. A

TV, Zenith console, about 10-yrs-old, $15. Inglewood, 672-5578. A

Motor Scooter, 3-wheel, 2½ hp B & S eng., $100. Rolling Hills Est., FR 5-8536. A

Range, O'Keefe & Merritt, 4-burner, griddle & broiler, gas, $60. Torrance, FR 1-2381. A

Chevrolet Impala, 1959 sedan, p/s, p/b, r/h, auto. trans., good tires, $700. L.A. 645-7276. A

Refrigerator, Crosley Shelvador, 9.5 cu. ft., auto. defrost, 50-lb. freezer, $50. L.A. 45, 670-2564. A

Pup, Irish setter, female, 7-mos-old, AKC reg., champ. stock, $100. Palmdale, 805-947-7867. A

Textbook, Business Data Processing & Programming by Gregory, used 1 semester, $4. Hawthorne, OS 5-6285. A

Ford Fairlane, 1957, conv., auto., new top & w/s/w tires, p/s, p/b, r/h, $400. P.V. Pen., 377-5084. A

TV, Motorola console, 21", $35. Hawthorne, OS 6-8842. A

Surfboard, Hobie, 9' 2"x22" w/T-band & ¼" rail stringer, $85. Downey, 861-6133. A

Pups, boxer, pedigreed, avail. about July 1, $50. L.A. 670-5627. A

Freezer, upright, 6', 3-yrs-old, $150. Hawthorne, OS 6-6847. A

Mercury Montclair, 1957 2-dr. h/top, 368 Turnpike Cruiser eng., 47,000 miles, $350. Redondo Bch., DA 6-7745. A

Refrigerator, white, 11 cu. ft., Frigidaire, crosstop freezer w/pullout shelf & meat tender, $140. Torrance, FR 1-3769. A

Home, 4-bdrm., 2-bath, custom decorated, landscaped, sprinklers, Spanish tile, 25' gar., less than 3-yrs-old, GI resale, furn. or unfurn., $31,950 furn. San Pedro, TE 3-6037. A

Ford, 1956 6-pass. station wagon, V-8 stick, o/drive, r/h, new clutch, valves & rings, $150. Gardena, 675-4267. A

French Poodle, toy, 7-wks-old, female, black, AKC reg., $50. Norwalk, 684-7673. A

Freezer, 10 cu. ft., chest-type, $30. Inglewood, OR 2-8629. A

Mattress & box spring, full size, $35. Torrance, DA 9-3721. A

Own-Your-Own Apt., near new, 2-bdrms, 2 baths, pool, hobby & party rms., $20,500. Gardena, DA 3-2350. A

Go-Cart, new chassis & eng., never used, requires completion, $75. L.A., GR 6-1635. A

Drums, complete set, Ludwig, sparkle blue, $350. Moorpark, 805-529-1285. A

Gym Set, has 2 swings, glide ride, trapeze bar & gym rings, $10. Inglewood, PL 5-7521.

Bedroom Set, 6-pc., blonde, $80. Gardena, DA 4-4625. A

Refrigerator, Marquette, dble. door, upright, 10 cu. ft., 12 cu. ft. freezer, $150. Gardena, DA 4-0649. A

Engine, Renault Dauphine, complete assembly w/radiator, generator, starter, air filter, rebuilt, painted, mounted on stand, $195. Encino, 788-0883. A

Plymouth custom Suburban, 1958, new brakes, major eng. tuneup, $250. San Pedro, 831-9589. A

Sofa, 3-pc. curved sectional, brown w/silver threads, Goodyear foam rubber, rev. cushions, $75. Long Beach, GA 6-4709. A

Bicycle, racing-type, boy's 12-spd. Campagnolo Derailleur, rat trap pedals, water bottle, $35. P.V. Pen., FR 8-2810. A

Pontiac Catalina, 1963, 2-dr. h/top, air cond., p/s, p/b, r/h, auto. trans., $2300. Hawthorne, 675-7027. A

Ford station wagon, 1957, r/h, p/s, $250. Gardena, DA 4-7209. A

Chevrolet Sedan, 1956, Powerglide, $400. Long Beach, GA 3-1363. A

Ford, 1958, V-8 auto, rebuilt motor, new tires & battery, hvy. duty shocks, $275. Hawthorne, 751-2979. A

Mercury, 1946, 2-dr., $125. Torrance, 326-2932. A

Chevrolet, 1957, Bel Air, 2-dr., h/top, new trans., tires, int., $700. Hawthorne, 371-0194. A

Falcon, 1960, 4-dr. sed., auto. trans., r/h, w/w tires, $495. Torrance, DA 5-3724. A

Patio Awning, 9 x 14 aluminum, still in box, $175. Huntington Pk., 589-9503. A

Camper, 8' cabover, ash int., butane stove w/oven control & refrigerator, $895. Gardena, OS 6-3726. A

Corvair Monza, 1963 conv., auto. trans., r/h, $1295. Torrance, 324-8397. A

For Sale

Volkswagen, 1955, sunroof, 1961 eng., 28 mpg, $450. L.A. 291-7715. A

Yawl, 28', Grey-Marine 22½ hp aux., SS rigging, running lights, req. CC equip., 8' plywood dinghy, $2500. Long Bch., 438-5579.

House, contemporary custom-built tri-level, 3-bdrm. & conv. den, city & harbor view, stable pad, trees, sprinklers & low maint. yd., $47,900. Eastview, TE 3-9862. A

Table, antique dropleaf, $47.50. L.A. 47, 755-6301. A

Mobile Home, 1960 10x50 Golden State, 1-bdrm., awning, 8x20 rollup cabana, 8x16 porch, cooler, $5900. Torrance, TE 5-3547. A

Sectional, 2 pc., aqua, lamps & bathroom sink, $40. Inglewood, OS 6-1475. A

Clarinet, Conn, $50. L.A., 755-6301. A

Volkswagen, 1964, 17,000 miles, $1500. Thousand Oaks, 805-495-9410. A

Ice Box, 18"x48"x24", $10. Torrance, FA 8-3306. A

Volkswagen, 1961 sedan, w/w, radio, $1000. Inglewood, OR 2-1835. A

Porsche 1500, 1955 speedster conv., new top, good tires, take over $43 mo. pymts., $633 bal. Inglewood, 674-5223. A

Bicycle, boy's 20", $15. Inglewood, PL 5-4497. A

Turntable, Miracord X-200, 4-spd. w/magic spindles, diamond cartridges for mono & stereo, $75. Torrance, DA 3-6745. A

Car Trailer, suitable to carry light vehicles, $125. Bellflower, 867-1476. A

Ford, Country sedan station wagon, 1957, $495. San Pedro, 547-3490. A

Ring, ladies' diamond dinner-type, $75. Hawthorne, 676-4236. A

Dinette Set, Virtue Bros., hutch & buffet, charcoal, 4 pink uphol. chairs, $100. L.A., PL 4-2702. A

Bedroom Set, traditional walnut, dble. bed, dresser, chest, vanity, nightstand, 2 mirrors, mattress & spring, $150. Inglewood, OR 1-3860. A

Honda, 305 Dream, 1964, $475. Redondo Bch., FR 6-4829. A

Ford, 1954 2-dr., V-8 deluxe, $100. Gardena, OS 5-2159. A

Boat, 18' fiberglass Overnighter, 60 hp, w/ trailer, new bait tank w/pump, many extras, $1350. San Pedro, 833-9165. A

Wristwatch, Omega Seamaster, auto., yellow gold, luminous & waterproof w/Omega leather band, $90. L.A., 464-6730. A

Chevrolet, 1956, V-8 4-dr. station wagon, auto. trans., r/h, o/hauled, trailer hitch, $350. P. V. Est., 375-7168. A

Wanted to Buy

Camper Jacks & pickup side view mirrors, sets of each. Torrance, DA 4-7623. B

Bicycle, ladies', good mechanical cond., hand brake or variable spd. control not necessary. Inglewood, 671-2170. B

Steel Guitar, Hawaiian, single neck w/amplifier. Lynwood, NE 1-9322. B

FREE (To Be Given Away)

Pups, cocker-poodle-beagle, black or brown w/white, avail. around 1st week of June. San Pedro, TE 3-4191. D

Pup, part cocker & part poodle, 7-mos-old, 13" high, house broken. Lawndale, 769-4269. D

Kittens, 4. Torrance, FR 1-1000. D

Rentals Offered

Unit, owner's, 1800 sq. ft., 3-bdrm., 3-bath, family rm., fireplace, pvt. deck & 3-car subterranean gar. w/storage, built-in kitchen, soft water system, adults, $265 lease. Redondo Bch., 373-1143. E

Apt, 2-bdrm., 2-bath, walk-in closets, pvt. patio, carport, $145 mo. Hawthorne, 839-5086. E

Apt, 1-bdrm., deluxe, built-ins, unfurn., $87.50 mo., Hawthorne, 676-2481. E

Sleeping Rooms, linen furn., single, $15 wk., double, $12.50 ea. wk. Lawndale, 371-6775. E

Studio Apt, unfurn., 2-bdrm., 1½-bath, tile kitchen & bath, hot water furn., walk to Norair, 1 child ok, $125 mo. Hawthorne, 679-0622. E

Cabin, Lake Arrowhead, near lake & village, all utilities, sleeps 6, $50 wk. Manhattan Bch., 379-2504. E

House, 1-bdrm., garage, $95 mo. Inglewood, OR 7-5709. E

Apt, 1-bdrm., furn. & unfurn., heated swimming pool 18'x40', no children or pets, 1 blk. to Gardena Valley shopping center, $110-$125. Gardena, 327-4791. E

Apt, 2-bdrm., near Northrop, partly furn., $80 mo. Inglewood, PL 4-1611. E

House, 3-bdrm., 1¾-bath, dishwasher & refrigerator, fireplace, 2-car gar., fenced backyard, 1½ blocks to Hawthorne High, avail. July 1, $165 mo. Hawthorne, OS 6-2846. E

House, 1-bdrm., small furn., utilities pd., close to Northrop, $90. Hawthorne, 676-0787. E

Apt, deluxe, 1-bdrm., built-ins, pool, $90 mo. Redondo Bch., 376-2117. E

Cabin, Green Valley Lake, $35 weekend, $65 week. Torrance, 320-2002. E

Apt, 2-3 bdrm., unfurn., exec-type, closed gar., 1 block to Northrop, $130-$160 mo. Hawthorne, 676-9620. E

Apt, 2 king-size bdrms., unfurn., pool, built-ins, $125 mo. Torrance, 323-1946. E

Owner's Apt., 4-bdrm., lower duplex, 1-yr.-old, 1¾ baths, lge. backyard, 2 blocks to school, walk to Centinela Park, lease, $195 mo. Inglewood, 673-4274. E

Personals

RETIREMENTS

The following individuals have recently retired from active service with Northrop Norair:

BATES—Edmond E., Quality Control. Seniority date, August 1, 1951. Retired March 1, 1965.

BECKER—Charles H., Tool Design and Fabrication. Seniority date, March 18, 1941. Retired June 1, 1965.

CHRISTY—Clarence C., Machine Maintenance. Seniority date, August 22, 1947. Retired May 1, 1965.

HARRELSON—Mrs. Madge L., Plumbing and Mechanical Assembly. Seniority date, October 13, 1953. Retired April 1, 1965.

JOHNSON—Mrs. Kathleen S., Graphic Services. Seniority date, November 30, 1951. Retired May 1, 1965.

KIDD—Nolan E., Tool Design subunit. Seniority date, January 7, 1941. Retired May 1, 1965.

MC AULIFFE—John F., Field Construction. Seniority date, July 19, 1954. Retired March 1, 1965.

MC MANUS—James B., Timekeeping. Seniority date, November 10, 1953. Retired June 1, 1965.

RICHARDSON—Joseph A., Materiel Coordination unit. Seniority date, February 15, 1940. Retired April 1, 1965.

ROBERT—Jonathan L., Advanced Production & Weld. Seniority date, September 22, 1958. Retired April 1, 1965.

SCHOETTLIN—Mrs. Tommie H., Telephone and Telegraph. Seniority date, September 22, 1949. Retired April 1, 1965.

SCOTT—Wiley W., Food Services unit. Seniority date, October 21, 1947. Retired May 1, 1965.

TUCKER—Mrs. Virginia L., Boundary Layer Research. Seniority date, May 3, 1948. Retired March 1, 1965.

I wish to thank all my wonderful friends for the help during my recent illness. No words can express my appreciation. My deepest gratitude to all of you for your kindness. GLORIA J. SKOK. L

Rentals Offered

Home, Camarillo Heights, 4-bdrm., family rm., split-level, patio, landscaped, yard care, $345 mo. Camarillo, 805-482-1004. E

Apt., 2-bdrm. deluxe, furn., lge. rooms, sep. dining area, 4 blocks from Norair, utilities pd., $125 mo. San Pedro, TE 3-2512. E

Apt., deluxe 2-bdrm., lge. pool, all extras, closed gar., near El Camino Col., $115. Torrance, DA 9-5986. E

Apt, 2-bdrm., 2-bath, all built-ins, fireplace, free hot water, unfurn., near Norair, $135 mo. Hawthorne, 679-1358. E

Apt, 1-bdrm., unfurn., $120; furn., $135; 2-bdrm., 2-bath, unfurn., $150; furn., $170. Inglewood, 671-0835. E

Apt, furn., bachelor-type, for single man, utilities paid, $55. Hawthorne, OS 6-5921. E

Apt, 2-bdrm., furn., fireplace, pvt. patio, ocean view, $150. Hermosa Bch., 372-5808. E

Apt, 1 & 2-bdrm., all elec., on Hawthorne Blvd., $85-$125. Torrance, 375-9397. E

Rentals Wanted

House, 2-3 bdrm., unfurn., in Hawthorne or Gardena. Hawthorne, 676-8581. F

For Sale or Trade

Rambler American, 1959, 2-dr., new paint & interior, o/hauled auto. trans., $450 or trade for Morris Minor, 1961, 2-dr., in good condition. San Pedro, TE 3-9455. M

Rifle, 30-30 Marlin, 1964, model 336 micro-groove, $50 or trade for a comparably new 9x12 heavy canvas tent. Redondo Bch., 379-3781. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Rosecrans & Normandie, Gardena. Pat Threlkeld, ext. 1860, 327-2323. 2

7:30 a.m. — 4:15 p.m.

Yukon & 154th, Lawndale. Sandra Joyce Gostel, ext. 1435, 679-4269. 3

La Cienega & El Segundo Blvd. or 120th St. & Isis Ave., Hawthorne. Penny Prouty, ext. 1458, OS 6-1296. 3

Alma & W. 24th St., Manhattan Beach, L. Berg, ext. 2763, 627-5578. 3

8 a.m. — 4:45 p.m.

Pacific Coast Hwy. & Ave. E or P. V. Blvd., Redondo. Bonnie Condon, ext. 617, 375-3744. 5

Santa Monica Area to Anaheim, Pacific Palisades. Alfred Weiss, ext. 1020, GL 4-9356. 5

Hawthorne & Pacific Coast Hwy., Torrance. Annette Adam, tie line 29-532, 375-9397. 5

Rides Offered

8 a.m. — 4:45 p.m.

Santa Monica Area to Anaheim, Pacific Palisades. Alfred Weiss, ext. 1020, GL 4-9356. 15

SPORTS CAR RALLY A SIMPLE AFFAIR

Those summer "doldrums" have caught up with planners of a June 6 NRC Sports Car Club breakfast rally—they are keeping it simple.

Participants will merely drive over a scenic tour-type route, winding up at a park with facilities for softball and volleyball. Departure from the NRC Clubhouse (Hawthorne) is at 7 a.m. with rally at the designated park at 9 a.m.

Breakfast will include eggs, sausage, pancakes and all the trimmings, prepared under direction of Ed Randolph, chef. Individuals will bring their own utensils.

Entry fee is $2.50 per couple and 50 cents for each guest over the age of 12 years. Hal Hunsberger is rallymaster.

Nortronics Men Attend Congress

Three Nortronics Division representatives were on hand recently for sessions held during the 12th Annual Western Safety Congress staged by the Greater Los Angeles Chapter, National Safety Council.

Ray Schultz, director of Manufacturing; Bob Salrin, chief of Special Projects, Manufacturing; and Bill Cornett, safety engineer, took part in Biltmore Hotel meetings.

Rockhound's Picnic June 20 at Vasquez

Desert regions in the summer months prove to be too much even for the most avid rock collector, so members of the Nortronics (Hawthorne) Gem and Mineral Club select more sedate activities during summer months.

Typical is the June 20 one-day picnic planned for the Vasquez Rocks County Park. NRC Commissioner Richard Hicks will provide route maps for those wishing to attend.

APOLLO

(Continued from page 1)

autopilot, which introduced an excessive roll rate.

Dr. Shea commented, "It was a 'free' demonstration of the escape system and a real one. The command module is resting out there on the desert floor. If there had been astronauts on board, they would have been unharmed."

Two days after the test, Dr. Shea provided more details to a convention of Aviation/Space Writers at Albuquerque.

". . . The parachutes deployed forward into the airstream, a most difficult condition, but they did all right. The spacecraft did three complete tumbles, then stabilized."

CARNEVALE DES ARTS

More than 225 Nortronics (Anaheim) employees and friends turned out May 22 at the NRC Clubhouse to take part in the "Carnevale des Arts" staged by NRC Art Club. A part of the crowd is shown above enjoying the program. Paintings valued at $875 were given as door prizes along with 500 balloons for youngsters. Ed Mosher, NRC commissioner, labeled the affair "a complete success."

HISTORIAN: Lee Chronicles His Times

(Continued from page 1)

azines and programs for important motion pictures.

While Randy admits he's quick with the shears, there's method to his labors. He'll clip the first advertisement for a new product or line (like electric toothbrushes, etc.), then never repeat that particular item. He has at least one picture of an automobile for every year since 1937.

Randy breaks up his scrapbook composition by adding photographs, stamps, money, etc. for each period covered.

On occasion, he'll put together one or more scrapbooks on a single subject, like the assassination of President John F. Kennedy, the life of Franklin D. Roosevelt and Clark Gable.

"I like to think someone will use these scrapbooks in 50 or 100 years to really know and understand the period in which I am living," Randy says.

Toward this end, he'll look long and hard to find the unusual, the different and the one-of-a-kind items.

How does he keep track of it all?

Mostly, in his head, although he's numbered each scrapbook and knows what each contains in a general way. He admits his biggest chore will come in indexing his collection.

Liley Lee, Randy's wife, shares his enthusiasm and keeps a weather eye out for new material. However, she admits Randy has the final say as to what stays and what goes.

One entire double clothes closet in the Lee's Santa Ana home is filled, floor to ceiling, with neatly stacked scrapbooks. In another area are magazine collections, and an odd assortment of things like a World War I helmet (with a bullet hole in it), old-time western cartridge belts, kerosene lamps, etc.

As NRC Commissioner for the Anaheim Travel Club, Randy has picked up many items on trips, including many of his postcards. And friends know to send him others of unusual sights and scenes around the world.

The Lees are always ready and willing to help anyone dig out information from their collection, but flatly draw the line at letting the material out.

"You can imagine the man-hours I've spent on this so why take a chance," Randy says. "But come out any time you think I can help.

"Say, did you know the first patent for a television set was issued 77 years ago? Come on I'll show you . . ."

Northrop and Moore Patent Blanket for Astronauts

Ray Moore has invented a novel and practical accessory for use in extended space flights of the future and Northrop Corporation has patented the idea.

Mr. Moore's "Zero G Restraint Blanket" strikes at the heart of two potential problems—keeping the astronaut in bed for needed sleep and providing an air of "something from home," filling a psychological need.

Staying in bed is a major problem, since weightlessness causes objects, including astronauts, to float free unless secured. Zero G also eliminates the need for such things as pillows and mattresses.

Mr. Moore has designed a lightweight blanket through which many small plastic tubes run at intervals, end to end. Each contains hundreds of small holes. Air from the spacecraft's environmental control system is routed through the tubes and out the holes, creating light pressures sufficient to hold the blanket in place. Small lines at each corner restrain the covering.

Requests for patent rights were submitted in 1961 when Mr. Moore was supervisor of Systems Integration at Northrop Space Laboratories. A patent was issued last month.

Now a Norair engineering specialist, Mr. Moore sees other possibilities for his idea. For instance, "sandwich-style" sleeping arrangements to conserve space.

"Since there is no recognized up or down in space, two men with these blankets could sleep back-to-back on almost any surface," he reasons.

Queries received since the patent was issued indicate others see some promise in the idea. One blanket manufacturer would like to turn them out, and scientific publications are clamoring for more information.

Nortronics Anaheim NRC Good Time Table

For enrollment or information on activities listed below, call or contact Personnel Activities, Anaheim, ext. 1092.

ART, Ed Mosher
Meet Wednesdays, 7 to 10 p.m., Clubhouse, 1834 Valencia Dr., Fullerton.

BASKETBALL, Don Ross
Seasonal.

BIBLE STUDY, Marvin Wiebe
Meet Mondays and Wednesdays, 11 to 11:35 a.m., Y-1 room 339.

BOWLING, Chet Guzinski
Mixed Fives meet Tuesday evenings. Men's meet Thursday evenings.

CAMERA, George Baker
Meet 3rd Saturday, 7:30 p.m., Clubhouse.

COIN, Orville Mitchell
Meet 2nd and 4th Tuesday of month, 7:30 p.m.

DESERT RATS, Larry Anderson
Meet only to plan trips.

GEM & MINERAL, Bob Cornelius
Meet 1st Monday of month for business. Meet Thursday, 7:30 p.m. for working night, Clubhouse.

GUN, Pat Elliott
Meet 1st Tuesday, 7:30 p.m., Clubhouse. Second Saturday, 9 a.m., Silverado Sportsmens.

RADIO, Paul Staudenmayer
Meet at noontime and after hours, radio shack.

TABLE TENNIS, Jack Flannagan
Meet for play at noontime.

WOMEN'S, Elaine Steiner
Meet Monday evenings at various places.

'PONY EXPRESS' MERCY MISSION FLOWN BY T-38

An Air Force T-38 Talon recently flew a successful supersonic errand of mercy under circumstances and in a setting that had all the earmarks of a space-age Pony Express.

The seven-month-old son of an Army Warrant Officer required Vaccinia Immune Globulin to combat after effects of a vaccination. Fort Carson, Colorado, Army officials determined the nearest source of the vaccine was Salt Lake City, Utah.

A hurry-up call went out to Ent AFB, Colorado, requesting Air Force assistance.

Major Thomas L. Titus of Williams AFB, Arizona, who was at Ent AFB in a T-38 for a special training mission, volunteered to fly the mission.

He flew to Salt Lake City and back to Ent AFB where a waiting Army helicopter shuttled the precious vaccine to Fort Carson.

YOUNG DRIVERS WORSE

Young drivers, those under 25 years of age, continue to have the worst driving record. In 1964 they were involved in 29% of the accidents that resulted in 48,000 traffic deaths while accounting for only 15% of the driving population.

DISNEYLAND DUO VISITS ANAHEIM, ALL HAVE A BALL

An unusual pair of visitors, answering to the names of "Goofy" and "Pluto," staged an "invasion" of Nortronics (Anaheim) recently.

Garbed in appropriate Walt Disney-created costumes, the pair startled secretaries at their desk, then won their hearts with gentlemanly hand kisses; sat in the laps of engineers and received gentle whacks for their troubles.

They caused screams of delight when they asked female electrical assemblers working on intricate components "when the spaghetti would be done."

It was all planned, although few knew it, to promote Northrop Night at Disneyland last week.

It worked, too. Ticket sales took a healthy upward leap the following day, according to Harry Belcher of Personnel Activities.

AH MADAME, BON JOUR—Gallant "Goofy" busses hand of Millie Guolo as Arnold Green, Lester Anderson and Joe Allen, from left, beam approval. Disney character, along with "Pluto," recently toured Nortronics (Anaheim), caused quite a stir among employees. They were plugging "NRC Night at Disneyland."

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 9 | June 16, 1965

CMIP Work Earns Praise Of LBJ, DOD

A Northrop display on its Cost and Management Improvement Program has completed a nationwide tour during which the Corporation's program was brought to the attention of military and industry representatives in five major cities.

The showings in Los Angeles, Chicago, New York, Washington, and Dallas were in conjunction with the Advanced Planning briefings for industry sponsored by the Department of Defense.

Part of the display was subsequently selected by DOD for a Pentagon exhibit of contractor cost reduction achievements.

In a letter to President and Chairman Thomas V. Jones, President Johnson noted Northrop's participation in the Advanced Planning briefings and added:

"Please accept my personal thanks for the achievements you have made, and for those which I am certain you will accomplish in the years ahead. You have justified my optimism that, together, we can achieve our common goal of a dollar's worth of defense for every dollar spent."

President Johnson in 1963 made a personal request to heads of major defense contractors to join in a positive program of cost reduction "to help guarantee our country a maximum of defense at a minimum of cost."

In his most recent letter to Mr. Jones, the President wrote:

"You will be pleased to know that seventy-eight of America's largest defense contractors—your own firm included—have formally pledged themselves to this continuing effort toward greater economy, and that those pledges are being daily redeemed in significant cost reductions. As promised in my initial letter, such achievements will be a significant factor in determining future source selections, and in establishing profit and fee rates for noncompetitive negotiated contracts."

GENERAL SCHRIEVER TOUR

General Bernard Schriever (left) commander of the Air Force Systems Command, was recent visitor to Nortronics (Anaheim) with Congressman Richard T. Hanna (center). F. W. Lynch (right) Nortronics vice president and assistant general manager—Operations, was official host and guide. Visitors were on tour of Orange County defense industries with Orange County Supervisors.

CLEAN ROOM PIONEER ELECTED EXECUTIVE OF NATIONAL GROUP

C. P. "Chuck" Shelly, Northrop Nortronics (Hawthorne) Special Projects superintendent, has been elected executive vice president of the American Association for Contamination Control (AACC).

Mr. Shelly

Mr. Shelly's election came last month at Miami where AACC's fourth annual Technical Meeting and Exhibit was held.

A charter member of AACC, Mr. Shelly served for two years as a director of the Western Region and two years as a national director.

During the Miami meeting he served as a moderator of a panel discussing "Sterilization of Interplanetary Spacecraft."

Over the past year, he has chaired an Ad Hoc committee to evaluate the AACC Journal and as a member of the Awards and Honors committee.

Mr. Shelly has been with Northrop for 19 years and was among the first assigned to investigate "clean room" concepts for Northrop.

Computer Group Gets AF Job for Inertial System

An Air Force contract to develop two lightweight, integrated circuit computers to be used in the development of a low-cost inertial navigation system has been awarded to Northrop Nortronics Computer group, headquartered at Hawthorne.

Delivery of the first of the NDC-1050A data processor will be made this November, with the second unit to follow two months later. Also included in the $360,000 Air Force award are control units, displays and gyro torquing devices.

According to a recent authoritative report, Air Force officers assigned to the project indicated the system would be available to commercial as well as military aircraft.

The 20-pound digital computers will be integrated into prototype low-cost inertial systems currently being developed by the Air Force Research and Technology Division's Avionics Laboratory. The work is being done at Holloman AFB, New Mexico.

Goal of the special Avionics Lab detachment is a navigation system which will operate at least 2500 hours without failure. Reliability goals are unprecedented for conventional navigation systems.

Nortronics has promised a mean-time-between-failure of 21,000 hours by 1966 for its computer, with a computational accuracy of one-tenth of a mile.

According to Lou Colombano, responsible engineer, the NDC-1050A has been specifically designed for low-cost inertial navigation requirements as an extension of the company's NDC-1000 and NDC-1050 general purpose data processors.

The NDC-1050A is another in a series of lightweight digital computers developed by the Computer group at Hawthorne, according to Roy Kauffold, director of the group.

CAMPER 'DROPS IN' UNEXPECTEDLY

Camper and travel trailer owners are accustomed to having other owners in and set up by them during the night, but few can say they've had someone actually drop in.

That is, not until 150 Northrop Camping Club members gathered at Lake Casitas over the Memorial Day weekend reported on their experiences.

The Northrop group was camped in a canyon. Above were many campers and trailers on another level. In the wee small hours an earth tremor occurred which caused a large camper to roll off the cliff between the groups, dropping 50 feet onto rocks and trees.

Quick to the rescue, the Northrop members helped extract the three occupants, notified Park Rangers and assisted in getting them into ambulances.

Colonel Keeling Takes AFPR Post

Lieutenant Colonel Charles W. Clark, Northrop Corporation Air Plant representative since May 1961, departs next week for a new duty assignment. He will be succeeded by Lieutenant Colonel Rufus K. Keeling.

Colonel Clark reports to the C-5 System Program Office, Aeronautical Systems Division, Air Force Systems Command, at Wright-Patterson AFB, Ohio. Colonel Keeling has served as chief of the Titan III Procurement Directorate with the Deputy Command for Manned Systems, Space Systems Division, AFSC.

253 ON WEST COAST TAKE PART

Nine Specialists Earn Degrees Under Education Plan

Two hundred fifty-three Northrop Nortronics employees working on the West Coast utilized Northrop's liberal Education Refund Plan to further their education during 1964, with 17 receiving degrees.

A final report, compiled by the Nortronics West Coast Personnel Training organization, covered details of participation in the Plan which provides an employee opportunity to receive refunds of up to 100 percent of the cost of taking approved courses and programs. The overall Plan is an outstanding example of Northrop's recognition of the importance of good educational foundations in the career plans of employees.

In discussing the Plan and its benefits, Hal Janssen, chief of the West Coast Personnel Compensation and Training group, stated that, "We know other employees completed courses in adult centers, city colleges, etc., where the costs of attendance were negligible, or, the courses taken did not have a direct relationship to the employee's work, and thus were not eligible for refund."

Upon completion of the fall/winter session, 169 employees received educational refunds. Nine employees earned degrees.

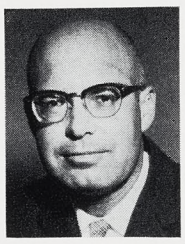
Vic Gausepohl, a financial analyst in Materiel services at Anaheim, received a B.S. in accounting from Cal State at Long Beach.

Leo Guolo, a program evaluation specialist working in the Technical Project Analysis & Reports organization in Anaheim, earned his M.B.A. from Cal State at Fullerton.

Bob Kalthoff, an associate engineer in Inertial Electronics Development at P.V., graduated from USC with a B.S. in electrical engineering.

John Leffingwell of Inertial **(See EDUCATION, page 6)**

Mr. Guolo

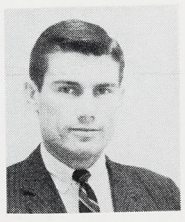


Mr. Oberholtz

Mr. Gausepohl

Mr. Newman

Mr. Williams



Mr. Leffingwell

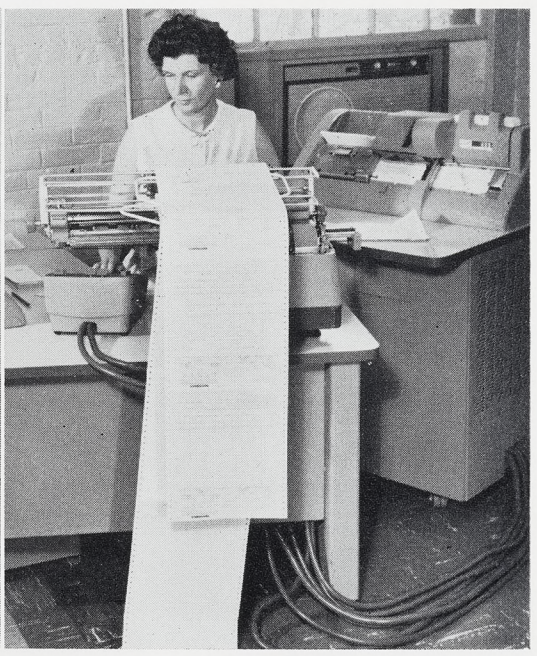
Mr. Kalthoff

Mr. Stormfeltz

NORTHROP GALS SECOND TO NONE AS 'SYSTEMS ENGINEERING' COMES TO OFFICES

MARIE STERBENZ
Nortronics, Hawthorne

BETTY WOMACK
Nortronics, Anaheim



ANN KODIS
Nortronics, PPD

Materiel Groups Rely on IBM 632 System To Handle $63.6 Million Yearly Operation

Norair and Nortronics Divisions are employing flexible mechanized systems to keep track of the $63.6 million or more they spend each year with suppliers.

Each month the systems process 6600 purchase orders, 1650 change orders and 17,500 receiving reports.

As replacements for manual systems utilized for years, the new systems are affording division management with increased data control measures, assisting in cost control, and helping do away with many manual steps with resulting reductions in the human error factor.

As the first major industry in the area to adopt mechanized purchase order and receiving report equipment, Northrop traces original application of the system to 1962.

Since that time the system has been placed in use at Norair (Mariposa facility) and Nortronics functions in Hawthorne, Anaheim and Massachusetts (Precision Products Department).

While not interconnected, each system installation generates input for the Northrop Corporation Data Processing function.

Applications of the system in the field of Materiel operations is basically the same, although each division and function reverts to special arrangements to satisfy specific requirements.

For instance, Nortronics (Hawthorne) utilizes the system in performing division accounts payable functions, including the writing of about 3000 checks monthly.

And Norair has found it necessary to make modifications to cover more complex operations.

Ultimately, the systems will give way to other more advanced systems.

Backbone of the system is the IBM 632 electronic typing calculator and its related and supporting equipment.

Nortronics has eight of these units divided among its three operation locations, while Norair utilizes five in a single location.

Norair's Materiel operation is typical of similar operations carried out at the other points.

The 632 units are programmed to accept both punch cards (containing standard notes and clauses) and variable data manually entered via keyboards. Ten-copy purchase order sets are prepared initially along with master and commitment cards which are turned out simultaneously. Master cards are held for subsequent receipt activity and purchase order follow-up reporting. Commitment cards are sorted, used for check tapes, and forwarded to Northrop Data Processing as commitment input.

Subsequent steps involve the duplication of master cards, routing of cards, purchase orders and like data to appropriate functions and other activities. Daily reports issued reflect items received on dock, and items on order as well as delinquent items.

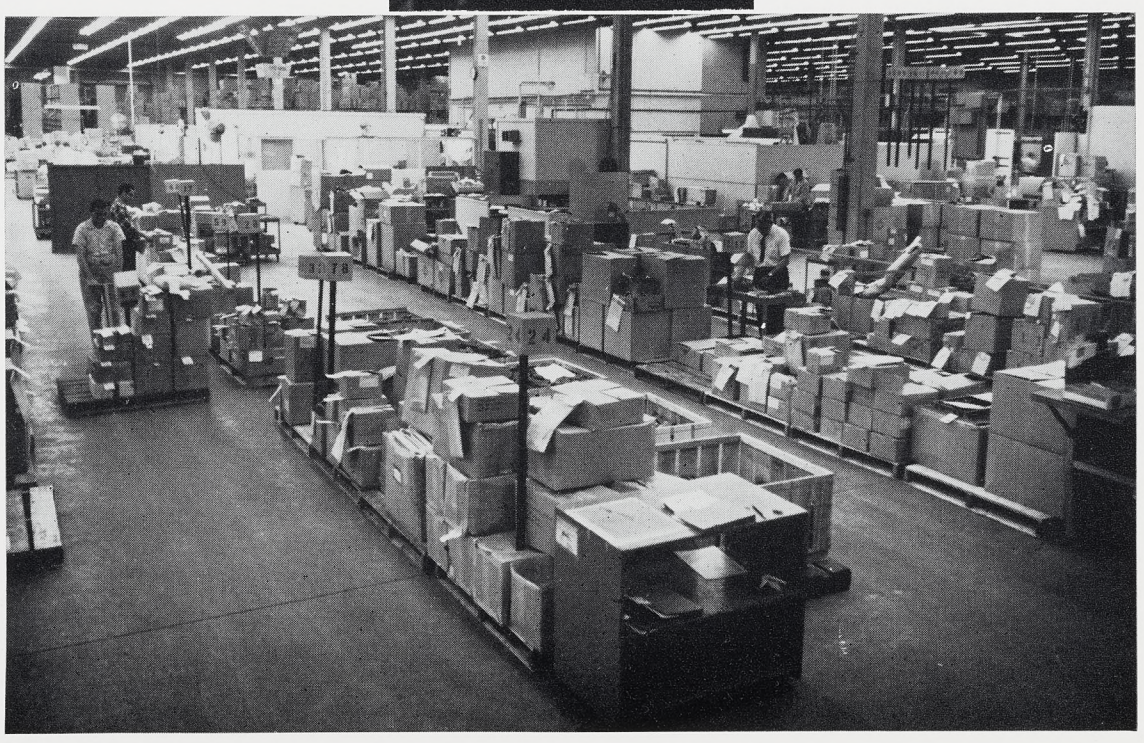
The system at Norair has

(See SYSTEM, page 3)

Five IBM 632 electronic typing calculators (left) are beginning point for Norair's mechanized purchase order and receiving report system. Operators from front to rear are: Ann Gaw, Frances Gibbs, Veronica Gregg, and Marion Condiotte.

END RESULT

Mariposa Warehouse (below) is place where paper meets hardware, as incoming materials are checked and routed to users. Items range from small handful lots to others requiring trailers for movement. A score of employees use mechanized purchase order and receiving report system at Mariposa (above) in two shifts. Cubicles in background are files for purchase order sets. Dorothy Hartman (left) holds handful of permanent tab cards that replace huge stack of forms. Use of punch cards in lieu of forms provides tremendous savings in filing space.



Staffs Meet Challenge of New System

Implementation of the 632 systems of mechanized purchase order and receiving report operations was a challenging experience for the men and women involved at Norair and Nortronics.

Normally, such a system required a year or more of detailed programming prior to adoption. Northrop organizations went through this phase in a matter of a few months. And instead of gradual installation over an extended period of time, the systems went into use in one all-inclusive move.

In short, manual methods employed for over 20 years were discarded and automation installed virtually overnight.

The new systems did not require the hiring of new personnel or detailed training programs. Northrop employees were trained on-the-job in minimum elapsed time.

"Northrop people deserve a great deal of credit for the success of the 632 system," said D. A. McInnis, Nortronics director of Materiel. "Each one accepted a new assignment, learned it quickly and is now performing it efficiently."

Many Northrop men were instrumental in development of the 632 applications to Northrop operations. Credit is shared by many. Among those contributing significantly to the success and implementation were Bob Clay, Bob Cooper, Gene Shafer, Dick Shave and Charles Benson of Nortronics, as well as J. K. States, Jim Van Dorn and Rose Roth of Norair.

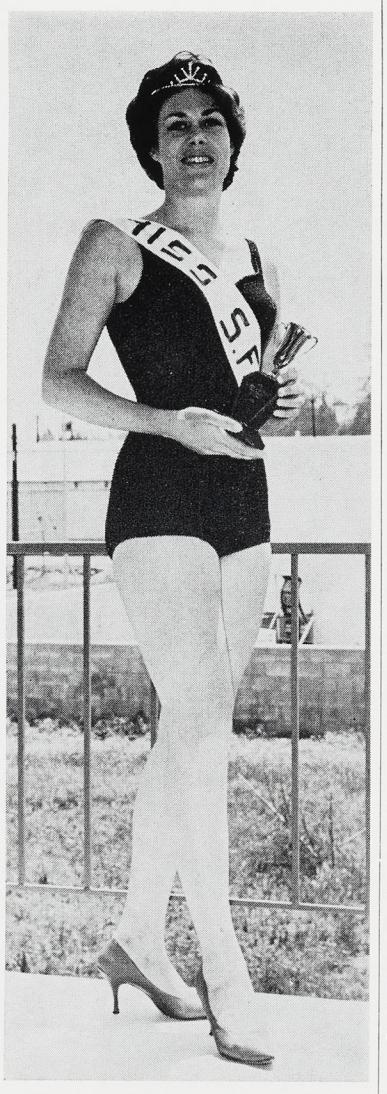
SYSTEM

(Continued from Page 2)

eliminated more than a dozen filing steps, greatly reduced manual posting, and allowed materials and goods to reach the user sooner than was previously possible.

"Information data, such as that supplied us by the 632 system, is mandatory in advanced material management," said Carl Hood, Norair director of Materiel. "While considerations of cost quality and delivery are still of paramount importance, Materiel involvement in all aspects of legal, regulatory, and financial management make day-to-day visibility of procurement activity essential. It can best be achieved through the application of automated data processing."

TIPTOPPER



Judy Rohrig of Northrop Ventura, Queen of the San Fernando Valley Tiptoppers Club, will enter Miss Tall North America pageant next month in Vail, Colorado. She is 5-11½ without heels.

Northrop Experts To Give Papers

Northrop Corporation personnel will be in the forefront July 26-29 during the second annual Meeting and Technical Demonstration of the American Institute of Aeronautics and Astronautics to be held in San Francisco's Civic Auditorium.

Richard E. Horner, Northrop senior vice president, is national president of AIAA and will preside.

Welko Gasich, Northrop Norair vice president and assistant general manager—Technical, will participate in a distinguished panel discussing "Future Trends in Aircraft Design."

Scheduled to present papers are R. N. Worth of Northrop Ventura (Spacecraft Session) and Sidney Thurston of Northrop Norair (Underwater Propulsion Session).

Northrop's Airborne Lightweight Optics Tracking System will be among technical demonstrations presented.

NORTRONICS GIVES ASSIST

Norair Perfects New Techniques For Aircraft Electrical Assembly

Northrop Norair has perfected new techniques for utilization of an old electrical assembly standby — the harness board — to produce components for the supersonic T-38 and F-5.

Credit for a special assist in this effort goes to Northrop Nortronics.

Each T-38 trainer and F-5 fighter contains 38 or more intricate electrical subassemblies fabricated in Norair's Electrical Subassembly operation headed by Tom Duddleston, general foreman. Some of these units contain as many as 60 individual wires of a dozen or more shapes, sizes and coverings.

Previous manufacturing routines called for wiring for each component or assembly to be cut to size and packaged. Packages then went to operators who installed them, often within the confines of small and compact housings. Cutting, stripping and soldering were also performed in equally-cramped quarters.

Now Norair utilizes refined flat-surfaced harness boards with permanent Mylar coverings. Each assembly has its own board and each board is clearly coded, showing the exact routing of individual wires through pins set in the boards. Routing, tying, cutting to size and stripping are accomplished in successive moves. The board is then reversed and all required relays, timers, circuit breakers, etc. are mounted in designated slots and terminations (soldering) accomplished. The completed assembly is then lifted off the board and is ready to be secured in its housing unit.

Enhancing the operation are special slotted wire boxes for each harness board. Wires are placed in coded bins that correspond to harness board codings. Operators merely take from the boxes the appropriate wires by code number. It is now possible to cut as many as 100 wires to desired dimensions for loading many boxes, thus eliminating the practice of sorting and packaging groups of wires for assemblies.

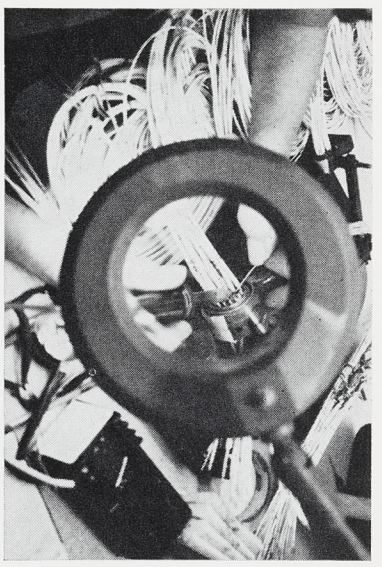
Norair has noted an increase in production through the elimination of manufacturing steps, simplification of decisions to be made by operators, and a reduction in training time for new employees as a result of the new techniques.

SNIP, SNIP AT RAPID CLIP—New Northrop Norair electric harness board allows Alice Runser to move more rapidly in turning out T-38 and F-5 components. Wire box contains wires coded to match harness board. Magnifying glass (below) enlarges intricate soldering operation on T-38 electrical subassembly.

"Our harness boards are actually training units, since the operator has only to follow coded directions," Mr. Duddleston said. "We feel the combination of advantages using this technique will result in cost reductions which will pay for installation of each harness board—wire box installation in about a year."

Working with Mr. Duddleston and his staff in perfecting present techniques have been such men as C. Z. Stine and R. H. Faulks of Education and Training; Matt Friedman and Lee Howell of Northrop Nortronics (where a similar system was developed previously); and W. P. Clott of Loft and Template section of Tooling.

The latter group turns out the new harness boards (about 30 are now in use) and helps in perfecting wire box units.



CRITICAL JOBS OPEN

Cash Offered for Employment Referrals

Northrop Corporation employees everywhere may be in a position to assist Northrop Norair in filling critical professional job openings and at the same time earn a cash award for their interest.

Norair's Employment Referral Award Plan provides payments of $100 or $200 to any Northrop employee who refers applicants who subsequently fill critical openings carried on prevailing critical lists.

For instance, a Nortronics (Anaheim) employee refers a friend or associate who ultimately joins Norair in a critical job classification. The employee earns the award specified for the opening.

In the past this method has been highly successful in attracting subsequent employees who are still on Northrop payrolls, making significant contributions to Northrop operations.

New applicants must remain on active payrolls for 90 days before referral awards are made.

At present prevailing critical openings worth $100 awards for referrals are in Technical organizations (engineers and research analysts) and Northrop Data Processing (programmers).

Critical openings warranting $200 referral payments in Technical organizations include senior engineers, engineering specialists, senior research analyst, scientists, senior scientists, senior technical specialists, and members of Technical management. In Northrop Data Processing the list includes senior programmers and data processing specialists.

Referral cards are available at all Northrop Industrial Relations offices. They should be completed and submitted to precede or accompany this referred person or his application.

VACATION CAN'T END TOO SOON FOR DENMARK-BOUND COED

For Bonnie Punt the summer months ahead may tend to drag a bit in view of what is in store for her in the fall.

Miss Punt, 19, is the daughter of Bunny Burgart, Group Insurance claims analyst assigned to Nortronics (Anaheim) for the past 12 years (she's been with Northrop 14 years).

Miss Punt is one of 50 Whittier College students selected to attend the University of Copenhagen (Denmark) this fall. She will attend class fulltime and reside with a Danish family during her September to February stay there.

Her selection for this honor was based on grades, maturity, citizenship and all-around personality. In addition to her semester of study at Copenhagen, she will tour France, England, Holland, Germany and Berlin at the onset, then take her annual Christmas vacation on another tour to visit Italy, Austria and Switzerland.

While winning this honor is especially attractive to Miss Punt, she's no stranger for honors bestowed. She is attending Whittier College on a scholarship given by the Colonial Coeds for grades, citizenship and general maturity.

And during 1963 she was selected to represent the Anaheim Council of the Girl Scouts at a national meeting of Girl Scout leaders held in Nassau.

Miss Punt, an attractive and modest youngster, has long been active in Anaheim youth activities and has consistently ranked among the top students in her classes scholastically.

She is currently finishing her freshman year at Whittier.

Symphonaires Slate Mikado Production

Northrop Symphonaires will present a one-night production of Gilbert and Sullivan's Mikado at 8 p.m., June 26 at Nyman Hall, Hawthorne High School.

The public is invited and there is no admission charge.

Burt Bracher will sing the leading role of Mikado. Featured will be Lois Cummins, Jim Sena, Vance Landers, Joe Cuny, Bee Boggess and Georgia Anderson.

The director is Paul Brizuela, formerly associated with the Roger Wagner Chorale.

Fortnight in Review

...AT HAWTHORNE...

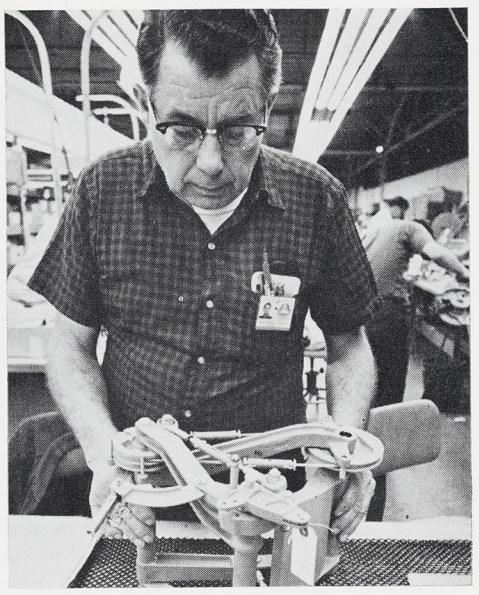
Colonel William R. Lawley (right) recently named Air Attache to the Philippines, visited Northrop Norair last week. He is looking at F-5 model with Dan Darnell, manager of Customer Relations following briefing and tour of F-5 assembly line. The Philippines will receive F-5's for their defense forces.
Helicopter (below) lifts materials for Norair air conditioning addition from truck to building top, saving time and money. In four hours 30,000 pounds were lifted.

IN THE CONEJO VALLEY...

Students from Oxnard High School toured Northrop Ventura facilities as part of vocational training program established last year by school in cooperation with Ventura Division and three other Conejo Valley firms. Participating companies furnished visual aids, instruction manuals and hardware for use in classrooms.

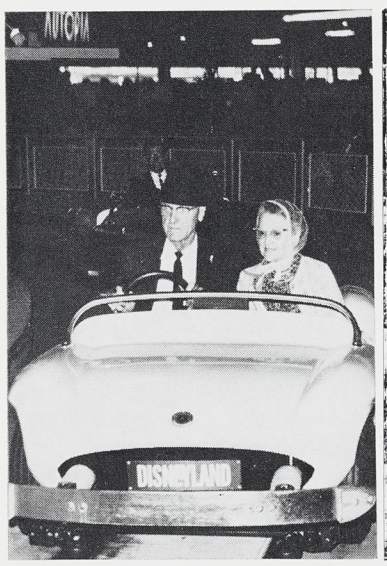
...AT CAPE KENNEDY AND ANAHEIM...

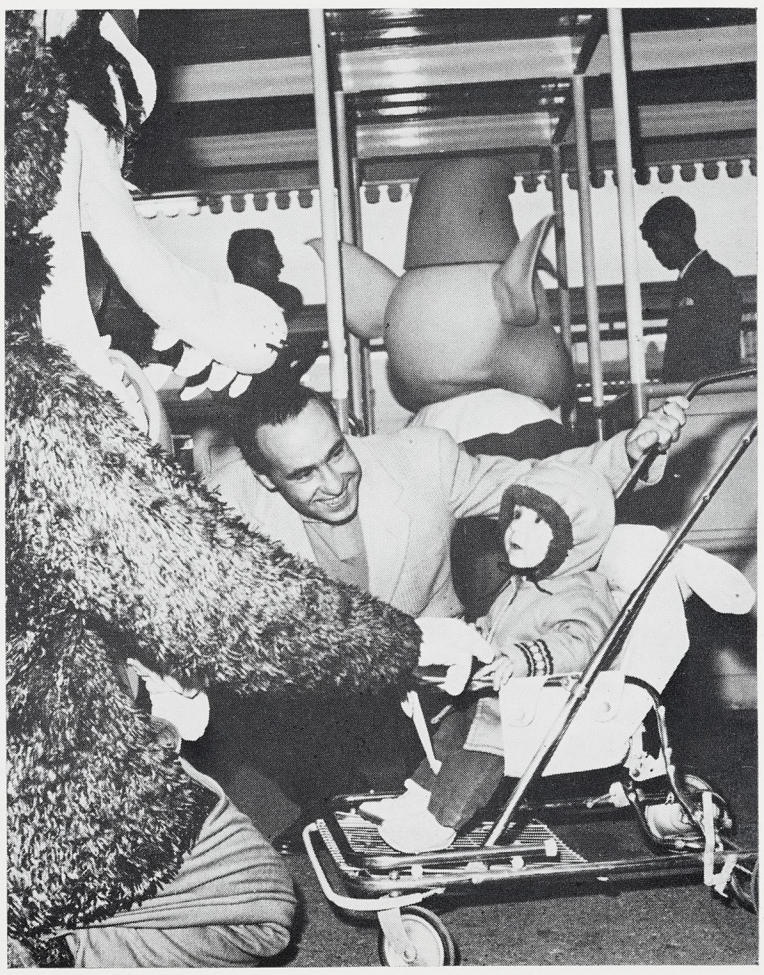
Breadboard model of Airborne Lightweight Optical Tracking System, developed by Northrop Nortronics, received another test at Cape Kennedy (above).



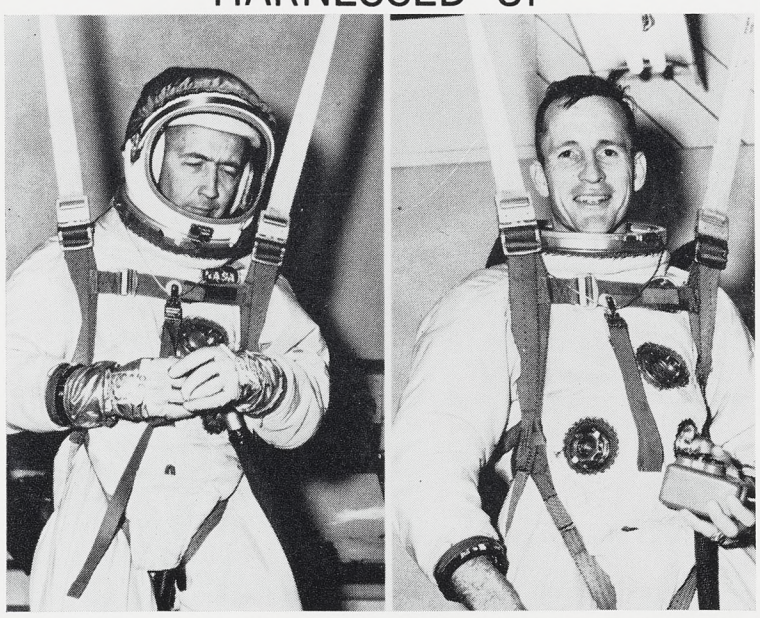
In photo at right Bill Willis and other craftsmen work on one of several projects at Anaheim.

. . . AND DEEP IN THE ENCHANTED KINGDOM,
NORTHROP AND ITS FAMILIES WORKED AND RELAXED





HARNESSED UP



Astronauts James A. McDivitt (left) and Edward H. White—the crew of Gemini IV spacecraft which splashed down safely last week under an 84-foot Ringsail parachute developed by Northrop Ventura—are pictured during fitting by Northrop specialists for personal parachute harnesses prior to flight.

PAGE COVERS PACIFIC

It's Already the Next Day When Hawaii Calls Saigon

Page Communications engineers wake up early.

Two or three mornings each week in Honolulu Guy Warren, manager of Field Services, Pacific, turns off his alarm clock at 4:30 a.m., makes himself a pot of coffee and places a call over the military joint switchboard to Washington headquarters.

Through such communications, Washington is kept informed of the status and progress of the company's various maintenance and operations projects in the Pacific and Far East areas.

Guy picks this unseemly hour to call for two reasons: First, because of the time difference, it is then 9:30 a.m. in Washington. Second, high-priority telephone traffic is relatively light at that time of day.

During the conversation questions may arise concerning Page business in Vietnam, Thailand or the Philippines. Guy then may place a call to John Kendrick, system manager for several M&O projects, in Saigon without fear of routing him from bed. It is then 10:30 p.m. the following day in Saigon.

The vastness of the Pacific is reflected in transportation as well as time.

Until recently when the Military Air Transport System began chartering jet airliners across the Pacific, a flight from Honolulu to Okinawa may have taken 22 hours. Now the same trip requires less than seven hours by jet—still a long flight for those accustomed to travelling within the continental U.S.

A trip in the Pacific Trust Territory to the remote islands of Ponape or Koror, located in the Carolines, where Page maintains facilities for the Army, is dependent on the erratic schedule of the once-a-week amphibious plane which shuttles between the islands and Guam.

An inspection trip from Honolulu to Ponape and return may require two weeks in order that the inspector may spend two days at the station.

An example of Page participation in Pacific communications: a message sent from a communications center near Honolulu is received almost instantaneously in a communications van in Ubon, Northern Thailand.

During transmission, the message passes through three communications systems, four nations, and the Pacific Trust Territories of the United Nations — a total of 14 communications stations. And Page people are on duty around the clock at all of these stations.

Today, most of Page's field service specialists are working in the Far East. This reflects the general shift of emphasis which the government has placed on communications system expansion. Page men formerly assigned to Europe and Africa have been transferred to the Far East to augment existing Page capability in the area.

The result is an organization of skilled technical and administrative personnel ready to meet any challenge to communications of the Free World.

NORTHROP NEWS

Vol. 23 No. 9

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 .pm.

Valley Dr. & 24th St., Hermosa Beach. Earl Noble, ext. 2544. 2

7:30 a.m. — 4:15 p.m.

Alma & 24th St., Manhattan Beach. L. Berg, ext. 2763, 672-5578. 3

El Segundo Blvd. & Aviation or 120th St. & Isis Ave., Hawthorne. Penny L. Prouty, ext. 1456, OS 6-1286. 3

8 a.m. — 4:45 p.m.

Wilmington & Victoria, Compton, D. K. Choo, ext. 2500, 631-4675. 5

Proctor Ave. & 5th Ave., in La Puente, Gardena. Norma Gallagher, ext. 2711, DA 7-9518. 5

Rides Offered

7:30 a.m. — 4:15 p.m.

Crescent & Dale, Buena Park, D. H. Eaglin, ext. 2655, TA 8-2857. 13

8 a.m. — 4:45 p.m.

Wilmington & Victoria, Compton, D. K. Choo, ext. 2500, 631-4675. 15

Proctor Ave. & 5th Ave., in La Puente, Gardena. Norma Gallagher, ext. 2711, DA 7-9518. 15

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Rifle, DCM Springfield, military-type, w/govt. ammo., $10. L.A., 754-4384. A

Stove, 1963 GE automatic, elec., $99. Torrance, 325-8211. A

Oldsmobile, 1954, rebuilt eng., needs body work, $165. Inglewood, 672-8830. A

House, 3-bdrm., 1 & 1¾ bath, fireplace, dishwasher, fenced yd., sprinkler sys., h/wood floors, plaster walls, $22,000. Brea, JA 9-3704. A

Sloop, 18′ Silhouette Class, 2 berths, incls. near new Evinrude 3 h.p. aux., $1500. Hawthorne, OS 9-2156. A

Textbook, Business Data processing & computer programming by Gregory & Von Horn, $4. El Segundo, EA 2-0222. A

Shotgun, Winchester, model 50, 20 ga., deluxe variable polychoke & recoil pad, $85. L.A., PL 6-0015. A

Wiglet, machine-made, light brown, human hair, worn once, $25. L.A., HO 5-9459. A

Camera, 8mm movie type, magazine load, Dejur Fadematic, turret model, 2 lens GE exposure meter & type A filter, $40. Box 901. A

Ford, ½-ton, 1950, Olds. eng., $350. Torrance, FR 1-5916. A

Karmann Ghia, 1963, under 12,000 miles, radio, seat belts, $1550. Torrance, 371-8939. A

Honda, 1964, 90 cc, 1-owner, black, $280. Inglewood, 671-5257. A

Sewing Machine, Pfaff, straight-needle, buttonhole attachment, portable, $25. Lawndale, OS 5-7316. A

Home, custom 3-bdrm., family rm., 1¾ bath, corner lot, completely fenced, landscaped, sprinklers, detached oversize gar. w/work rm., indoor BBQ, GI appraisal, $32,500. L.A., FA 1-4621. A

Tape Player, for auto, stereo, w/tapes, $75. Torrance, DA 4-8814. A

Buttonhole Attachment for Kenmore rotary sewing machine, $1.50. Hawthorne, OS 6-0041. A

Washer, Frigidaire, auto., w/Wedgewood gas dryer, $125. Sherman Oaks, 789-4635. A

Bicycle, girl's, 26″ 3-spd., green, $25. L.A., 292-4958. A

Air Conditioner, 1-ton, 11,000 B.T.U., Fedders, 2-yrs.-old, used one summer, operates on 110 volts, clock & auto. timer, $150. Ventura, 805-643-9413. A

Bedroom Set, dbl. bed, hard rock maple, night stand, desk-chest, mirror-dresser, chest-on-chest, $100. Manhattan Bch., FR 4-8036. A

Washing Machine, Kenmore auto., used 8 mos., $100. Playa del Rey, 378-0955. A

Range, gas, Norge, 36-in. wide, clock/timer, bottom broiler, $95. San Marino, 281-3588. A

Cemetery Lot, Inglewood Park, 2, dble. interment, El Portal sect., $1815. Palos Verdes Pen., 377-1180. A

Bedroom Set, twin beds & headboards, 2 3-drawer chests, bookcase, $45. Torrance, 378-0094. A

Honda Scrambler, 1963, custom paint & access., chrome, $600. Portuguese Bend, FR 7-2921. A

Ford station wagon, 1956, V-8 auto. trans. needs repair, good tires, $75. Gardena, DA 9-4954. A

Ercoupe, model 415-C, 85 h.p., all metal, very low time, $2850. Redondo, FR 4-2915. A

Chevrolet Impala, 1958, 2-dr. h/top, p/s, 3-spd. 348 eng., $550. Gardena, DA 4-0158. A

Dodge, Coronet Lancer, 1956, 2-dr., p/s, p/b, recent o/haul, $295. Gardena, DA 9-2904. A

Bed, Hollywood w/box spring & 6 dresser drwrs., $38. Hollydale, ME 3-2395. A

Baby Scale, precision-type, $8. Hermosa Bch., 376-5131. A

Apt. Bldg., 4-unit, near Northrop, 8-mos.-old, $67,500. Hawthorne, 676-6134. A

Couch & Matching Chair, overstuffed, sage color, $15. Inglewood, 672-5578. A

Swimming Pool, 12′ dia. x 3′ Doughboy, complete w/filter, vacuum, ladder, $50. Box 902. A

Stove, Gaffers & Sattler, deluxe model, avail. June 19, $150. L.A., 291-7715. A

Exercycle, 1-yr.-old, $400. Inglewood, 674-4192. A

Screw Jacks, 4, 1¼″x6″ hvy-duty, for house or mobile home, $15. Huntington Pk., 589-9503. A

Sailboat, 24′ Hershoff, rare h/woods, teak decks, inboard, full boat cover, $6500. San Pedro, TE 3-6037. A

Apt. House, 4-unit, Fullerton Col. dist., tenants pay util., 2-bath, air cond., patios, $629.50 mo. inc. for $7500 down, $61,500. Buena Park, TA 8-2857. A

Power Edger, May Co.'s best, $55. Inglewood, 675-0521. A

Surfboard, Jacobs, 9′, $50. Manhattan Bch., 372-6603. A

For Sale

Wheels, 3 chrome, 2 Tempest & 1 Chevrolet, 15″ & standard reverse, $25. Lynwood, NE 1-9322. A

Surface Unit, Universal-Waste King, gas, never used, $45. Canoga Park, DI 0-7752. A

Pram, 8′ & 1½ h.p. Evinrude, glassed seams, oars, $80. Redondo Bch., FR 4-2188. A

Ford, 1930 Model A, stock, 4-dr. sedan, $175. Santa Monica, EX 4-3345. A

Carpet, 40 yds., plain, all wool freize, plus 4 bound scatter rugs to match, rose-tan color, $150. Gardena, 327-4791. A

Telescope, Tasco, 266X, tripod, carrying case, lenses, $50. Gardena, DA 9-9219. A

Dinette Set, formica, chrome finish, 12″ leaf, oval shape, 4 chairs, $50. Manhattan Bch., FR 2-6916. A

Tape Recorder, 4-track stereo, w/2 microphones, takes RCA or convent. cartridge, Silvertone, $170. Buena Park, LA 1-4711. A

Wristwatch, Omega Seamaster, gold auto. luminous & waterproof w/gold expansion band, $90. L.A., 464-6730. A

Buick, 1962 Special, V-6, 2-dr. coupe, $1100. Hawthorne, 677-4271. A

Pups, Boxer, AKC reg., $50. L.A. 670-5627. A

Ford, 1959 Galaxie 4-dr. sedan, p/s, r/h, recent new paint & radiator, $575. Redondo Bch., FR 5-3914. A

Shotgun, 12-ga. J. C. Higgins, w/polychoke & vented ribs, 7-mos.-old, $75. Inglewood, 674-1651. A

Trailer, 1-wheel, wood box, incl. hitch, $30. Huntington Bch., 714-897-7166. A

Accordion, 120 bass w/case, $100. Venice, EX 1-2040. A

Home, contemporary, 1500 sq. ft., 3-bdrm., 2-bath, fireplace, family rm., landscaped, outside lights, fence, brick patio, sprinklers, 1½-yrs.-old, $29,500. Thousand Oaks, 805-495-9573. A

Trailer, 1962 Shasta, 12′, lightweight, butane, 120-V, sleeps 4, $750. Redondo Bch., 376-2117. A

Jeep station wagon, 1°53, new crankshaft, recent o/haul, new tires, $250. Inglewood, 677-6562. A

Enlarging Lens, Schneider Componar f4.5-75mm, $20. Inglewood, 671-9269. A

Air Cooler, Presto 900, 3-spd., cart, used twice, $25. Costa Mesa, 545-3611. A

Oldsmobile Dynamic 88, 1960, 2-dr., h/top, p/s, p/b, r/h, auto. trans., orig. owner, $700. Sherman Oaks, 784-9776. A

Nash, 1951, $150. Hawthorne, OS 9-6215. A

Books, Great Books of the Western World w/syntopican & bookcase, linen bound, $225. Fullerton, LA 5-2767. A

Chevrolet Impala, 1960, 421 cu. in., many extras, $1750. Inglewood, 674-1847. A

Movie Projector, 18mm Tower, 750 watt, forward, still, reverse & rapid rewind, $50. Hawthorne, 675-8413. A

Fairlane, 1957 convertible, auto., new top & tires, r/h, p/s, p/b, $400. Palos Verdes Pen., 377-5084. A

Boat, 16′, 12 gal. built-in gas tank, 1962 Mercury Marc 700, 70 h.p., less than 50 hrs. on eng., Hewitt trailer, many extras, $1395. Redondo Bch., 376-1491. A

House Trailer, 10′, sink, ice box, bed, $135. L.A., LO 9-8524. A

VW Microbus, 1962, deluxe seats, good eng., tires, radio, cot to fit, $1300. San Pedro, 833-5935. A

Micrometer, Lufkin, 1-2, $6. Gardena, DA 4-8853. A

Rambler, 1959 station wagon, 6-cyl., r/h, 68,000 miles, 1-owner, $175. Pac. Palisades, GR 2-2848. A

Flash Equipment, Ultrablitz MK-II elect. flash, Nicad battery w/charger & A.C. cord, 40 watt-secs. power, $25. Los Alamitos, GE 1-4233. A

House, 2-bdrm., R-3 lot, $4000 dn., $27,900. L.A., AX 2-9489. A

Buick sta. wagon, 1956, r/h, good tires, $350. Rolling Hills, FR 8-5856. A

Cabin, Big Bear, 2-bdrm., knotty pine interior, full bath & fireplace, $2000 dn., $11,-500. Redondo Bch., FR 8-2055. A

Radio, coin-operated, night stand size, convert. to play w/out meters, $4. Burbank, PO 1-9565. A

Tape Recorder, 1963 Akai M-7 model, 4-track stereo, 2 lge. speakers, all access. plus extras, over 30 erasable tapes, $350. Manhattan Bch., 372-0816. A

Beds, twin, maple, can be made into bunk beds, $12. Torrance, 375-1756. A

Window & Screen Set, alum., crank-out-type, 3′x4′, $20. Torrance, FA 8-3306. A

Go-Cart chassis, accelerator & brake linkage, padded seat & back, steering & eng. mount installed, needs eng. & wheels, $30. L.A., 476-1635. A

Cat, Siamese, 1½-yr.-old, female, bluepoint, papers, shots, $25. Culver City, 838-4378. A

Bicycle, boy's, 24″, $20. Rolling Hills Est., FR 5-8536. A

Travel Trailer, 15′, 1957, new tires, elec. brakes, water tank w/pump faucet, $650. Gardena, DA 3-7988. A

Falcon, 1961 4-dr. wagon, r/h, s/belts, auto., 1-owner, $800. Torrance, 328-3509. A

Wanted to Buy

Stamps, S&H Green &/or Blue Chip, $3 bk. Inglewood, 674-1847. B

Studio Couch. Hawthorne, OS 9-6982. B

Patio Furniture, used, reasonable. Anaheim, PR 6-2578. B

Tent w/floor, 9x12 camping-type. Gardena, 324-3760. B

Wanted to Buy

Swing-Lawn Set, including sliding board, must be sturdy & reasonable. Gardena, DA 3-6745. B

Chevrolet, 3-spd. trans. w/overdrive, for 1960 283 eng. Whittier, OX 3-4117. B

For Trade

Corvair 95 Greenbrier, 1964, 4-spd., equipped as camper, trade for late model compact car or sta. wagon. Hawthorne, 675-9557. C

FREE (To Be Given Away)

Dog, good w/children. Gardena, DA 4-4625. D

Kittens, 7-wks.-old. Palos Verdes Est., FR 5-4733. D

Rentals Offered

Sleeping Rooms, pvt. bath & entrance, furn., utilities pd., close to shopping & Northrop, $45 mo. Hawthorne, OS 6-7328. E

Beach House, furn. 2-bdrm. over dble. gar., 4 blks. from ocean, $135 mo. Gardena, DA 4-7688. E

House, 2-bdrm., tile kitchen & bath, h/wood floors, trash & water pd., gar., redecorated, $115 mo. Hawthorne, OS 5-9695. E

Apt., furn., 1-bdrm., ½ duplex, 1 mile from Northrop, lots of closets, gar., adults, no pets, $85 mo. Inglewood, OR 7-4388. E

Apt., 1-bdrm., furn., utilities inc., no children, no pets, $115 mo. Hawthorne, 676-3951. E

Apt., 1-bdrm., closed gar., laundry fac., $85 mo. Torrance, 320-1005. E

Home, 3-bdrm., 1 bath, fenced yd., $115 mo. Fullerton, 528-6914. E

Apt., 2-bdrm., unfurn., lge. pool, all extras, closed gar., near El Camino Col., $115. Torrance, DA 9-5986. E

Unit, owner's, 1800 sq. ft., 3-bdrm., 3-bath, family rm., fireplace, pvt. deck & 3-car sub. gar. w/storage, soft water sys., adults, $260 lease. Inglewood, 373-1143. E

Cabin, Green Valley Lake, $35 weekend; $65 week. Torrance, 320-2002. E

Apt., 2-bdrm., $115 mo. Box 903. E

Apt., unfurn., 1-bdrm., triplex, small pvt. patio, laundry rm., carport, adults, $78.50. Gardena, DA 9-9195. E

Bachelor Apt., 1-bdrm. unfurn. & furn., closed gar., $95 & $100. Palos Verdes Ests., FR 5-0867. E

House, 3-bdrm., 2 baths, 20x20 den, lge. playhouse in rear, walled yd., 10 minutes to Northrop, $160 mo. Redondo Bch., FR6-6415. E

Apt., 2-bdrm., unfurn., near S. Bay Center, $100 mo. Redondo Bch., 376-4978. E

Sleeping Rooms, new, linen furn., $15 wk. singles; $12.50 ea. wk. dble., laundry avail. Lawndale, 371-6775. E

Found

Graduation Ring, in restroom at Disneyland, Northrop night. Van Nuys, 780-5727. K

Personals

Ironing in my home, 1 block from Norair, $1 hr. Hawthorne, 675-6291. L

Will Do Typing in my home, term papers, theses, etc. Inglewood, 676-1475. L

Openings available in A&E Flying Club, 2 Bonanzas, 2 172's. Playa del Rey, 397-6326. L

Please accept my sincere thanks for the many luncheon parties & lovely gifts given me upon my retirement. KAY JOHNSON. L

To NRC & my many friends at Northrop, thank you for all your cards, remembrances & flowers sent to me while recovering from auto accident. RUTH T. LINDSTROM. L

We would like to express our appreciation for the kindness & thoughtfulness during the illness & loss of our beloved husband & father, Herchel Scarberry. Especially Dept. 5503. HILDA & RONALD SCARBERRY. L

Apt, to share w/girl, 20-25, 1-bdrm., furn., pool, 2 blocks to ocean. Hawthorne, 372-7804. L

For Sale or Trade

Ford Country Sedan, 9-pass., 1960, low mileage, 1 owner, $795 or trade for smaller car. Inglewood, 755-1071. M

Apt. House, 5-unit, 1-yr.-old, 2 blks. from Norair, $81,500 or trade for other property. Hawthorne, OS 6-7417. M

Summer Swim Plans Announced By NRC

Northrop's annual summer swim program for employees and their families has been set up again by joint effort of NRC Councils at all locations.

Beginning Tuesday, June 22, and continuing each Tuesday and Thursday through August 19, the program will center at the Leuzinger high school pool, located on Rosecrans between Prairie and Hawthorne.

Northrop families will be admitted without charge from 4:30 to 6:45 on these days. Showers will be provided, but individuals must bring their own towels. Dick Cahill, lifeguard, will be on duty at all times.

'Old Friends' Down; Fans Breathe Easy

Despite success after success of Northrop Ventura landing systems, there is still that "moment of truth" in each test or flight when everyone holds their breath.

After astronauts James McDivitt and Edward White splashed down safely last week in their Gemini IV spacecraft, one employee at Ventura Division commented:

"You don't realize you're uneasy about it, but it's great when you know they're back on the ground."

With the addition of McDivitt and White to the list, there are now 10 astronauts who have used Northrop landing systems to return from orbital and suborbital flights.

Commenting on last week's four-day flight, Dr. Robert R. Gilruth, director of the Manned Spacecraft Center at Houston, said:

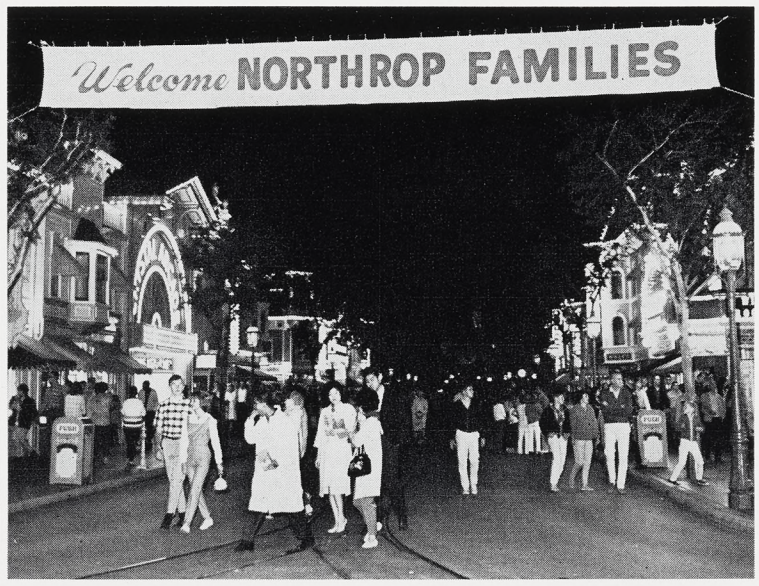
"I think we are all extremely proud of the performance of this entire team, NASA, military and industry. I couldn't be happier."

Dr. George Mueller, associate administrator for the Center, added: "We are all tremendously pleased with the results. It was one of the most successful missions we have carried out in the manned space flight program."

While the Northrop Ventura project team was as elated as everyone else, Program Manager Stan Gewant voiced a minor disappointment that the 84-foot Ringsail parachute, which gently delivered the astronauts to their Atlantic landing, was not recovered.

"There is much we could have learned from examining the chute, particularly verification of effects of the space environment on the materials used in the system."

NORTHROPLAND



Disneyland put on royal welcome for employees last month during special night, attended by thousands of Northrop personnel and their families. (Other photos on page 4)

French Recovery System Developed by Northrop

A parachute recovery system similar to the ones developed to return American astronauts from space has been produced for France's space research program by Northrop Ventura, it was announced this week in Paris.

Northrop, which provides the recovery systems for America's manned space programs including Gemini and Apollo, produced the system for the Super-Eridan high altitude rocket probe under contract to Sud Aviation.

This was disclosed at a press conference at the 26th Salon International d'Aeronautique et de l'Espace, where the recovery system was displayed publicly for the first time.

The re-entry nose cone from the Super-Eridan can be recovered on land or at sea. Landing velocity is about 35 feet per second.

The Northrop recovery system consists of five major components: a 1.2 foot diameter Hemisflo pilot parachute; a 3.56 foot Hemisflo drogue parachute; a 41-foot diameter Ringsail main parachute; a flotation bag with 440-pound buoyance, and water location aids including radio beacon, flashing light and dye marker.

The system was developed by Northrop and tested in the California desert and in the Mediterranean.

Instrument Society Selects T.V. Jones

President and Chairman Thomas V. Jones has been named to a Sponsors committee to plan the 1965 Instrument Society of America (ISA) conference and exhibit in Los Angeles October 4-7.

The conference is expected to attract more than 20,000 instrument specialists to technical sessions and exhibits at the Los Angeles Sports Arena and the Biltmore and Ambassador hotels.

Dr. Arnold O. Beckman, chairman of the board of Beckman Instruments, Inc., is chairman of the 44-member "blue-ribbon" committee, formed to "point up the strong and diverse capabilities and market potential for western industry," according to the ISA.

First Keg Call

Nortronics (Anaheim) bowling commissioner, Chet Guzinski, this week sounded the first call for winter bowling leagues.

Teams or individuals interested in a Tuesday Mixed Fives or a Thursday Men's Scratch league may contact Personnel Activities.

LIFTING BODY VEHICLE DELIVERED TO NASA

Official ceremonies were held yesterday at Northrop Norair for the first of two unique lifting body research vehicles Northrop is producing for the National Aeronautics and Space Administration (NASA).

Delivered to NASA was the vehicle designated officially as the M2-F2.

Dr. M. B. Ames jr., director of Space Vehicle Research for NASA's Office of Advanced Research and Technology, was the principal speaker.

Taking part in the ceremonies were ranking NASA, Air Force and Northrop officials, plus invited dignitaries and news media representatives.

Present plans call for the M2-F2 to be taken immediately to the Flight Research Center at Edwards and then to NASA's Ames Research Center at Moffett Field, California, for an extensive wind tunnel test program. Following this program, the M2-F2 will return to the Flight Research Center for flight test.

Lifting body research vehicles will be carried aloft under the wing of a B-52 mothership prior to actual flight.

SATELLITE BEGINS OPERATION

Northrop Beams Historic Message

Northrop Corporation helped make communications history last week by participating in the first Southern California commercial message test of the COMSAT Early Bird satellite.

Teletype signals bounced off the satellite carried an exchange of greetings between Senior Vice President Richard R. Nolan in Beverly Hills and President and Chairman Thomas V. Jones in Paris.

"We wish to extend our best wishes via Early Bird COMSAT release for the successful participation of the Northrop F-5 fighter and the other Northrop exhibits in the Paris Air show," messaged Mr. Nolan.

"We are happy to be able to send you these greetings via Early Bird from the Northrop exhibit at the opening of the 26th International Aerospace Salon at LeBourget, Paris, France," replied Mr. Jones. "Let us hope that this significant advance in communication will help to promote a still closer relationship between the countries on both sides of the Atlantic."

Northrop was one of a score of California and Arizona firms invited to participate in the test by Western Union International, Inc. Arrangements for the transmission were made by Louise Hobson, Communications supervisor, and Robert W. Rolfe, director, Management services, Northrop Norair.

NRC ROUNDUP

Travel, Sports, Camping Highlight Club Activities

Nortronics (Anaheim) employees interested in NRC's group travel excursion to Europe this fall will gather at 7:30 p.m. June 29 at the NRC Clubhouse, 1834 Valencia Drive, Fullerton.

Employees from other divisions or organizations working in the Hawthorne complex or Ventura Division are invited to attend this affair or to wait until similar meetings are staged in their immediate vicinity later.

The June 29 meeting will find a photographer on hand to make passport photographs for a nominal fee and an insurance representative to arrange special coverage for those interested. Movies of the 1964 joint NRC Travel Club trip to Europe will be shown.

Reservations are still being accepted for this tour, from October 20 to November 7, at all Personnel Activities functions. Participants have a choice of round-trip transportation ($315) only, or transportation and a tour of either northern or southern Europe. The tour cost is an additional $298 and includes transportation (in Europe), meals and lodgings.

NRC Plans Visit To San Francisco

Northrop travelers participating in a July 30-August 1 San Francisco tour planned by the NRC Travel Club will have their choice of two possible bay area arrangements on arrival.

One is an exciting tour of San Francisco's famed night life, the other is an equally-interesting sightseeing tour for families.

Departure via jet aircraft will be at 7 p.m., July 30 from International Airport, with return at 4 p.m. August 1.

Total cost per person is $53.85 and includes transportation, tips, lodging at the Fielding Hotel and a bundle of special surprises for one and all.

Reservations must be made at Personnel Activities outlets by July 15.

Vasquez Rock Park Club Destination

Plans have been completed for staging NRC Gem and Mineral Club's annual picnic for Norair and Nortronics members June 20 at Vasquez Rock Park.

Those attending have an option of camping out over a two-day period or attending the picnic only. Travel trailers, campers and tenters can be accommodated at nominal fees. Water is available, but firewood is not, Commissioners Dan Kozlow (Norair) and Richard Hicks (Nortronics) report.

Information on the best travel routes may be obtained from Personnel Activities offices.

PAWLICKI'S PERCH REAPS BONANZA

As ocean fish go he wasn't very big, but the three-pound, two-ounce perch John Pawlicki landed last February really reaped a bonanza.

First, there were annual trophies presented by both NRC and Red's Bait and Tackle Shop. Next came three fishing rods, valued at $25, $35 and $65 each and representing weekly, monthly and annual prizes respectively. In addition, there was a rod and reel worth $65 from Norm's Marina. Finally, there was a $5 NRC prize and a button award from the Southwestern Anglers Association.

Mr. Pawlicki received his awards recently at the conclusion of annual tabulations.

(Editor's note: Maybe that was a really big fish, after all.)

EDUCATION

(Continued from page 1)

Electronics Development at Palos Verdes graduated with a M.S. degree in electrical engineering from USC.

Hiroshi Nakano, assigned to the Inertial Systems Development group at P.V. as a senior engineer, received the M.S. in engineering from UCLA.

Alan Newman, an engineer working in Advanced Delivery Systems in the Ordnance section at Anaheim, earned his M.S. degree in electrical engineering at West Coast University.

Lou Oberholtz, a senior engineer of Special Projects Systems Development in Hawthorne, received the M.S. in electrical engineering from USC.

Harold Stormfeltz, a senior engineer working in the Ordnance section at Anaheim on the Hawk Project, received the B.S. degree in aeronautical engineering from the Northrop Institute of Technology.

Bart Williams of Personnel Liaison for Special Projects in Hawthorne earned his M.B.A. from USC.

"These nine individuals," concluded Mr. Janssen, "are to be congratulated for the successful completion of their programs. These accomplishments represent a significant sacrifice and investment in time and effort on the part of the employee and his family. I know that I speak for their supervisors, and for the general management of the Division in offering congratulations to them, and in saying that Nortronics is proud to have provided assistance to them under the Educational Refund Plan."

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 10 | June 30, 1965

ZD Program Expanded on East Coast

Employee response to Nortronics Precision Products Department (PPD) Zero Defects program, now in its sixth month, has been so great and so varied that the Department is revising and consolidating long-standing cost saving and suggestion programs into one over-all function under the ZD administrator.

According to Administrator John Lyons, employees have gone far beyond the scope of eliminating errors in their active ZD program participation.

As a result, Error Cause Removal (ECR) and Cost and Management Improvement Program (CMIP) functions have now been consolidated into a Performance Improvement Program (PIP), which works as an arm of the ZD program.

The ZD committee has formed a six-man advisory subcommittee, known as ZD boosters.

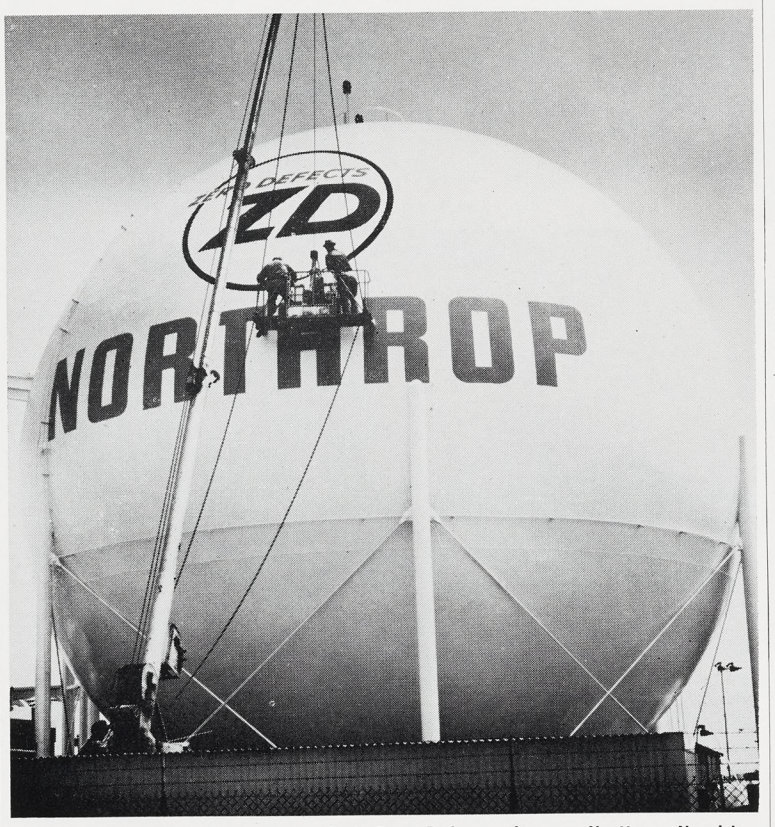
According to Mr. Lyons, the boosters are in closer daily contact with the hundreds of participants in the program, and will always be up to date on ZD and PIP goals, statistics and problems in order to better facilitate the exchange of ideas between employees and the program office.

"The committee wants to be sure everyone understands the idea of ZD and how PIP contributes to the success of the total program, which is Zero Defects," Mr. Lyons said.

PPD has had in effect since September 1964 an ECR program, but referrals have doubled

(See PPD, page 6)

"ZD" ON THE BALL



Painters add final touches to giant Zero Defects sign on Northrop Norair's 60-foot diameter hypersonic wind tunnel sphere. Signs have appeared through Norair and Northrop Space Laboratories proclaiming program dedicated to eliminating errors (story on page 4).

Northrop Ventura Readies New Turbojet Target Drone

A low turbojet powered target, designed to fill the gap between supersonic and low speed drones presently in service is under development by Ventura Division, it was announced this month by Vice President and General Manager George F. Douglas.

Designated NV-105, the new target is described by Program Manager Don Conlan as a "low cost, variable speed, medium performance target for surface-to-air gunnery and missile system training."

Potential customers, including the U.S. Army, Navy and Marines and Allied forces, have indicated a need for this type of target.

"The NV-105," he said, "is designed to fit into the performance envelope between the 200-knot KD2R-5 and the supersonic RP-76, now in standard Northrop Ventura production."

NV-105 will provide realistic training for crews operating 20 and 40 mm guns, three and five inch deck guns, and more than half a dozen different missiles.

A turbojet engine weighing 30 pounds and delivering 100 pounds of thrust has been modified by Williams Research of Walled Lake, Michigan especially for the new target.

While NV-105 incorporates new configurations in its design, most of the on-board components are off-the-shelf items.

DIJULIO REVIVES FAMILY ART, BUILDS INSTRUMENT TO DO IT

Mention guitar to the average individual and most likely the wild world of rock and roll will flash to his mind.

But for many centuries, long before rock and roll, guitar has meant classical music — music played by a skilled artist on a difficult and versatile instrument.

Roger M. DiJulio leaned heavily to classical music when he taught himself to play the guitar and came to realize private lessons were in order, if he were ever to achieve the satisfaction he sought. Finding a suitable teacher was not a small task. However, the instructor proved minor in the final hurdle — Roger needed a new classical guitar.

At present such a guitar can cost from $500 to $1000 or even more; far more than Roger, who plays merely for his own enjoyment, wanted to invest.

Len Kendy and Bill Stroub, accomplished guitarists and fellow employees at Northrop Nortronics, were consulted. From the talks came a gem of an idea — Roger should make his own guitar. Bill and Len provided references and possible sources of the right kind of materials. Both were extremely interested, since each would like one day to make his own guitar and welcomed someone who would "break the ice."

"My first discovery was a shock. The right grades of quality materials were very expensive," Roger says, "hardly worth gambling on a prototype of dubious outcome."

Consequently, Roger set out to find other sources where the costs were more in line. From a search of local lumber yards he came up with just the right pieces of wal-

(See GUITAR, page 6)

Northrop Honors 25-Year Veterans At Club Meeting

More than 200 executives, including Corporate Vice President and Nortronics General Manager Fred Stevens, paid tribute to the second group of recipients of Northrop 25-year service awards at the June meeting of the Division's Management Club in Long Beach.

Four Northrop veterans, presently assigned to the Anaheim facility, received plaques engraved with a certificate of service and the coveted three-diamond pins.

Recipients were: Hugh Zebarth, foreman of sheet metal; Ray Dohn of the Material section; John Privett, senior contract administrator in the Ordnance Systems section; and Grant Gunderson, chief of Production.

Mr. Dohn, who could not attend the Club meeting, received his award in a private ceremony the following day.

The men, who all joined Northrop in its first year of operation, were the guests of Mr. Stevens. Mr. Stevens established a precedent for making 25 year awards when he invited wives of recipients.

The presentation of awards followed briefings by the evening's principal speakers, Joe Radigan and Dr. William Parker, who spoke on recent developments in inertial systems and current business trends, respectively.

In his brief presentation address, Mr. Stevens emphasized the importance of people to the Division's future, and placed equal significance on the role of employees' wives.

Top door prize for the evening, a Sony portable television set, went to Bob Keller, supervisor of Security at Palos Verdes.

Northrop, now in its 26th year of operation, honored the first Nortronics recipients of 25-year service awards last December, when President and Chairman Thomas V. Jones made presentations to John Foote, Bill Boyes and Paul Streib.

PATIENT SALISBURY PASSES MILESTONES; LOOKS TO OTHERS

It could only happen to a master planner.

Robert P. Salisbury of Nortronics (Hawthorne) passed two major milestones in his life this month and is due for a third next week.

He received his bachelor of science degree in General Management at the 82nd annual commencement of the University of Southern California, which isn't extraordinary unless you consider he first started working on it 19 years ago.

Then there was the day this month when he was called into the office of Special Projects Director G. R. Fritzel for a ceremony marking 15 years' service with Northrop.

On July 5 the scene will shift to the Salisbury household where Bob and his wife will celebrate their 20th wedding anniversary.

Not long after Mr. Salisbury began accumulating longevity as a husband and student, he joined Northrop in 1950 as a member of the Flight Service organization working on B-29's.

Since then he has been a crew chief, foreman, supervisor of Manufacturing Engineering, supervisor of Operations Analysis, and a program planner.

Today he is responsible for all master planning in Nortronics' Special Projects section at Hawthorne.

As for master planning his own life, he reported with his characteristic patience, "I've started another 20 years of marriage; another 15 years with Northrop and next September I'm going back to school to work on my master's degree."

Water Sportsmen Focus on National Safe Boating Week

Northrop recreation clubs devoted to water sports joined this week in endorsing the aims of National Safe Boating Week (July 4-10), recently proclaimed by President Johnson.

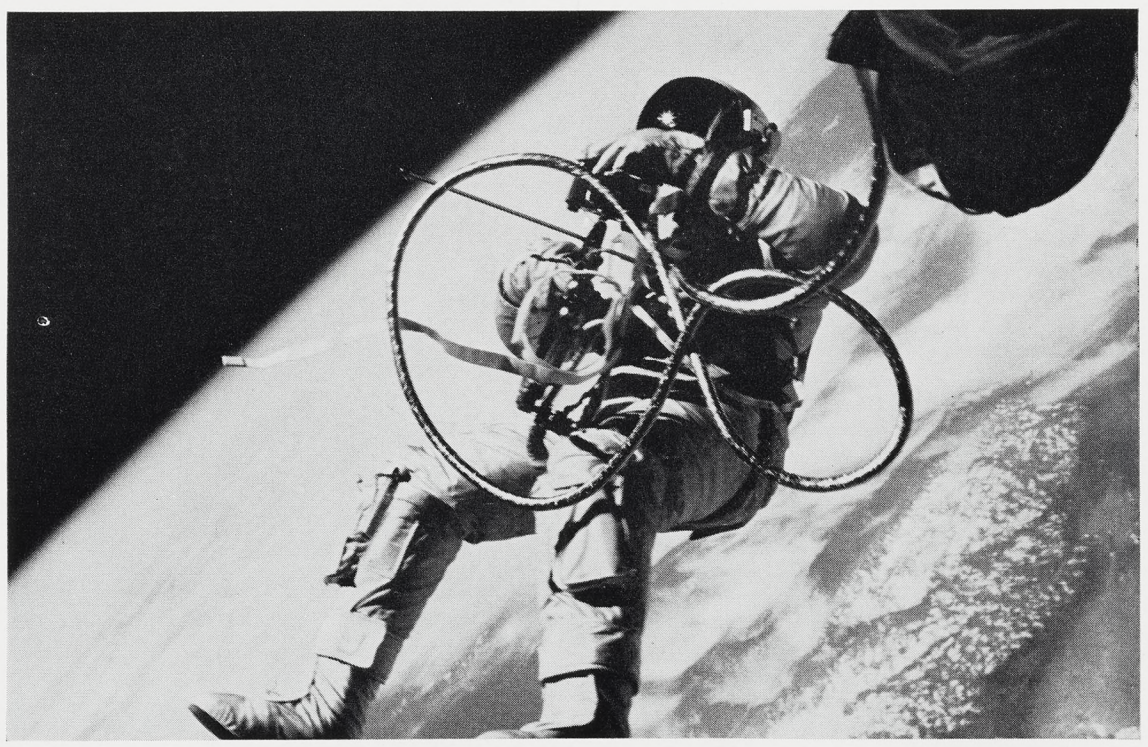
Captain Walter Curwen, the Coast Guard's Search and Rescue Operations chief for Southern California, has noted 75 percent of salt water boating accidents in the area occur in the "terror triangle" between Newport Beach, Catalina and Santa Barbara.

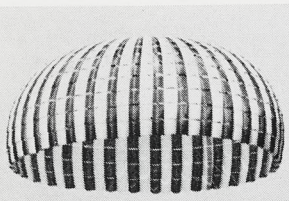
He suggests each boat owner comply with all of the following recommendations, if they operate on salt water.

1. Carry a marine radio capable of operating on 2182 kilocycles, the international distress

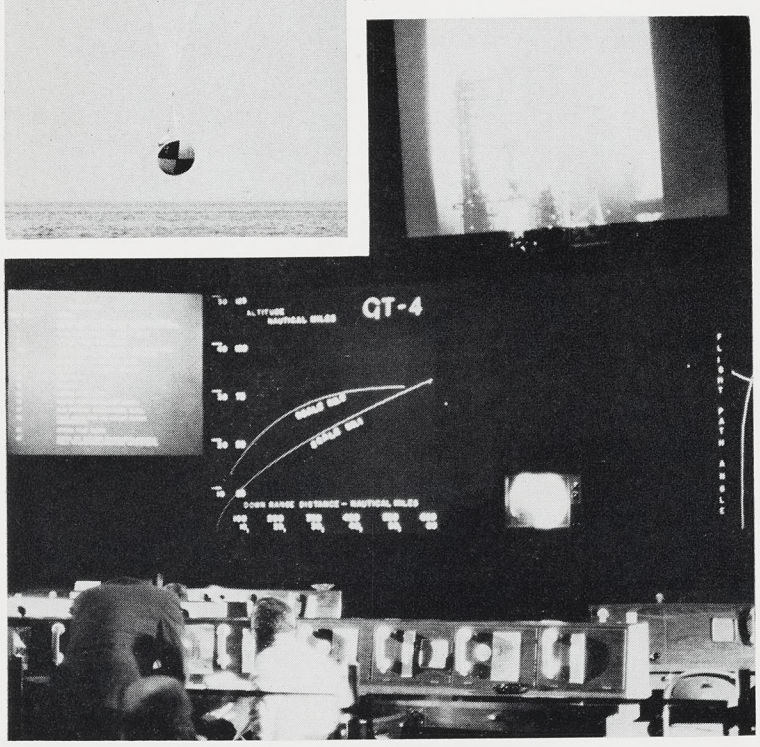
(See BOATING, page 6)

QUARTER CENTURY—Nortronics 25-year service award recipients and their wives flank Division's top executive, Fred Stevens. From left: Ollie and Hugh Zebarth, Virginia Gunderson, Mr. Stevens, Grant Gunderson, and Evie and John Privett. Unable to attend the presentation, held in conjunction with the June Management Club meeting, were Ray and Wilma Dohn. Men are second from Nortronics to complete 25 years with Northrop.





Major item in Northrop catalog of activities in and around confines of Cape Kennedy is parachute landing system. Hundreds of men and women work many hours at Newbury Park prior to launch to cut, sew and inspect (top of page) in preparation for dramatic moment when main chute opens (left). During flights and missile launches, Nortronics' Vigicon display system (below) provides necessary data in real time to ground control centers. Northrop specialists were already at work on Gemini V flight, scheduled for August, when Astronaut Ed White was taking his historic walk in space (right).



Northrop at the Cape: A Catalog of Technology

Northrop participation in such Cape Kennedy activities as Gemini, Ranger, Mariner and missile development reflects a depth in multiple technologies so varied, that even Northrop veterans assigned to the space port for more than a decade are still awed by the list.

"An aerial photo of the Cape area marked with sites of Northrop's activities, past and present, would be virtually covered with notations," says Northrop's Herman McDonald.

"Pick your direction from any point—up into the sky, across the land or deep into the depth of the Atlantic—and you'll cross the site of a Northrop activity," Mr. McDonald said.

For instance, there are 600 mm Ballistic cameras as well as ALOTS (Airborne Lightweight Optical Tracking System), both made by Nortronics, for keeping unwinking eyes on launches.

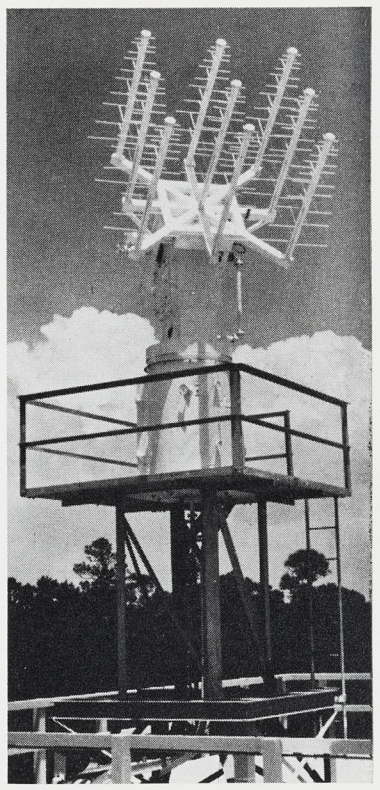
Elsewhere, in the birds themselves, are gyros for Polaris, Saturn, Titan, Atlas and Minuteman as well as a Q-Ball angle of attack systems for Saturn. There are star trackers, sensors and components for Ranger and Mariner, also made by Nortronics.

The automatic checkout and periscope systems for Polaris submarines and gyroscopes galore are other Nortronics products.

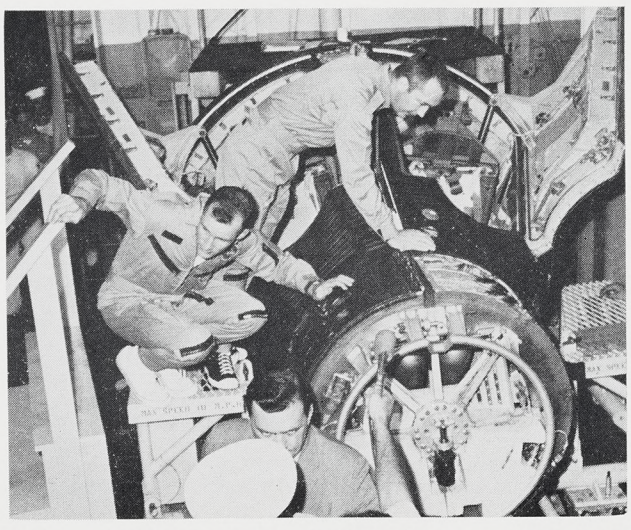
On land, in the new range control center is a Nortronics-developed Vigicon display system for real time screening of launch and range data. On the high seas are range ships equipped with the Mark IV SINS system and there are intercommunications systems for Saturn launch complexes.

Ventura's all-important recovery systems played key roles in Mercury and Gemini flights and will be used on Gemini and Apollo

(See CAPE KENNEDY, page 3)



Page Communications Engineers plays daily role in manned space program with advanced communications stations in the Bahamas.



GEMINI TWINS BOARD WASP CARRIER . . . INSPECT THEIR SPACECRAFT . . . AND CHECK IN WITH PRESIDENT JOHNSON.

Cable to Cape Put in Shape By OMEGA

There was a high wind in San Salvador last month.

Daring it were a U.S. Navy ship, a U.S. Army ship and the U.S. Underseas Cable Corporation (USUCC) cable and repair ship OMEGA.

Their mission was to find and repair a break in a cable 880 fathoms below the surface of the Atlantic Ocean. They had four days to complete repairs to the communications link used for Cape Kennedy contact with the Gemini IV spacecraft (launched June 3).

The 1500 mile cable connects tracking stations in the Bahamas to the Cape.

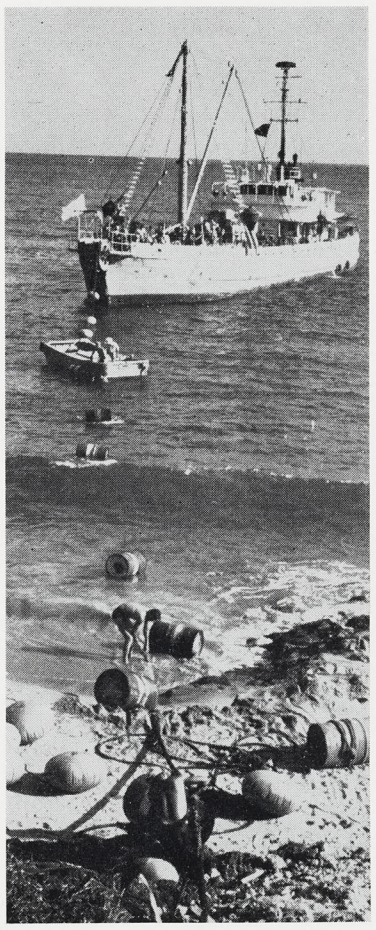
USUCC, a joint venture of Northrop, Phelps Dodge Corporation, and Felten and Guilleaume Carlswerk AG (Germany), dispatched the OMEGA from a Navy assignment in Great Exuma Sound near San Salvador.

Although the break was reached promptly enough — one mile southwest of San Salvador—high winds and rough seas hampered grappling operations.

Air Force Eastern Test Range officials set up an alternate communications chain from Grand Turk Island, Antigua and San Salvador to Puerto Rico to the mainland, using other existing cables and microwaves.

With Gemini IV already in orbit, the Navy ship THOR arrived to retrieve one end of the broken cable and to pass it to OMEGA for splicing with the other end, already on board OMEGA.

Restoration of the direct line from Antigua to Cape Kennedy was accomplished June 4 and resumed its real time transmission. Gemini IV floated to earth June 7 under a Northrop Ventura parachute landing system with only one minute of contact lost in four days.



U.S. Cable Corporation ship OMEGA at anchor off San Salvador.

While USUCC did not lay the Grand Turk-to-mainland cable it repaired, the Washington, D.C. based firm put down a 716 mile continuation of the original system in 1963 for the U.S. Air Force between Grand Turk and Antigua.

Other major USUCC contracts since its formation in 1959 include a cable linking the Philippines with South Vietnam and another linking Oahu in the Hawaiian Islands with Johnston Island in the Pacific.

In addition to its numerous technological breakthroughs in specific areas of oceanographic-hydrospace-communications disciplines, USUCC is the original American company possessing all the expertise and capabilities to carry a cable project from its conception to completion.

Duplicate of Mariner is Crystal Ball For JPL/Northrop Systems Team

A group of specialists, combining the talents of Northrop and Jet Propulsion Laboratory are keeping as close to the Mariner Mars spacecraft as if it were in the same room at JPL in Pasadena.

Their principal tool is a duplicate tool of the real Mariner, now 14 days from encounter with earth's second closest planetary neighbor.

Called a Proof Test Model (PTM), the laboratory craft is used to simulate what is happening to Mariner as it speeds through space on an intercept trajectory 134 million miles from earth.

Six of these specialists (three Northrop and three JPL) are part of the MC-1 (PTM) test direction team, which has been supporting the Mariner IV spacecraft to Mars from assembly through the upcoming conclusion of its 325 million mile journey.

Working in an arena of operational support equipment, the team receives data from the Mariner PTM similar to that which the Space Flight Operations facility (SFOF) receives from Mariner IV.

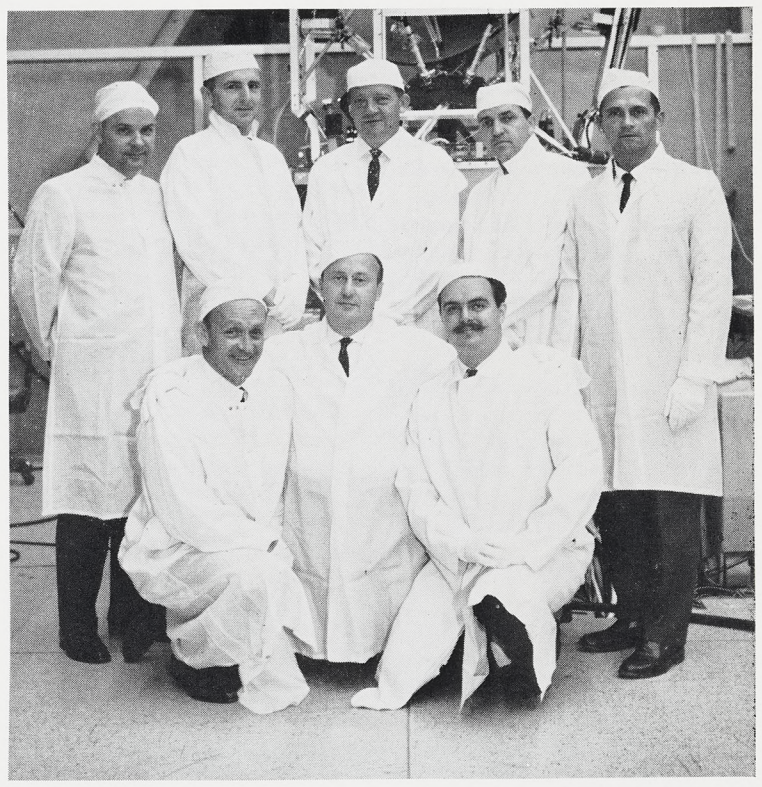
The group, however, only moves into the front line when a critical decision affecting Mariner's operation must be made by SFOF.

A good example occurred during the mid-course maneuver last December.

Six days and more than a million miles from earth, Mariner began receiving more than a score of commands from ground control on December 4. Plans called for Mariner to perform the maneuver automatically after instructions had been stored in its central computer and sequencer.

The spacecraft had acknowledged receipt of its instructions, and the countdown had begun for firing its rocket motor to change its trajectory.

Suddenly, word was received that Mariner had lost the lock on its guiding star, Canopus at the moment the mid-course maneuver had begun.



WHERE'S BEN—Part of Northrop force assigned to JPL Mariner mission, now two weeks from Mars destination, gather in PfM building. Standing (from left) are Bob Miller, Ken Laverty, Tom Laney, Sherman Scott, and Frank Orlick. Kneeling is Jack Howard, Nat Nezhni and Bill Eller. Working around PTM requires adherence to clean room conditions.

The group had been receiving inputs of pertinent data from systems on board Mariner IV. The specialists had their PTM in operation and were simulating the spacecraft's behavior.

The Mariner Flight Control group in the SFOF wanted a checkout of possible causes, using the PTM.

A number of tests were conducted in support of the decisions that were made.

The maneuver for that day was postponed and started over again early on December 5. This time the mid-course maneuver went perfectly, resulting in a bull's eye trajectory. The spacecraft will fly by Mars about 5600 miles from the surface at closest approach a little after 6 p.m. PDT on July 14.

With the most critical maneuvers of all only two weeks away, the group is already supporting the determination of the best procedure for execution by sampling alternatives on the PTM.

Critical functions can be accomplished automatically or by ground control, depending on the data returned as to how each subsystem is functioning. The decision on whether to allow Mariner to proceed automatically when it reaches Mars or turn control over to ground stations will depend partially on tests now being run by the group on its laboratory model.

The group, headed by JPL's G. Wade Earle, includes from NSL: Bob Miller, telecommunications representative, and Tom Laney mechanical and propulsion representative, and Ken Laverty, Guidance and Control representative.

Mr. Earle is a former Northrop employee.

In addition to the test direction team, NSL's industrial support group on the Mariner program includes:

Bill Ellern, environmental test engineer on Ranger and Mariner spacecraft, presently assigned as cognizant engineer on JPL's thermal vacuum environment group.

Frank Orlick, test engineer, responsible for space simulation tests of Mariner spacecraft.

Nat Nezhni, dynamics test engineer on the craft and its subsystems, presently cognizant engineer for JPL Induced Environment group. Mr. Nezhni designed, fabricated and installed special facilities required for flight vibration and shock acceptance tests.

Jack Howard, project coordinator and administrator of Northrop personnel at JPL.

Independence Day Brings Long Holiday

Independence Day, which falls during the coming weekend, will afford Northrop Corporation employees everywhere their second "long weekend" of the year.

Because July 4 occurs on Sunday, July 5, Monday will be observed as a holiday. Regular work shifts will resume July 6.

DeBuono Paper Deals With Tiny Telemeters

G. J. DeBuono, NSL Life Sciences staff member, presented a paper at the Space Electronics Symposium held late last month at the International Hotel.

Titled "Subminiature Implantable Telemeters for Biological Monitoring," Mr. DeBuono's paper dealt with the design of telemeters small enough to be implanted in tiny pocket mice for sensing and transmitting information during space flights.

Space Flight Control Meet Led by Chattler

Leo Chattler, Nortronics vice president and manager of Marine Equipment Department in Needham, Massachusetts, has been named general chairman for the Aerospace Vehicle Flight Control conference July 13-15 in Los Angeles.

The conference, sponsored jointly by the National Aeronautics and Space Administration and the Society of Automotive Engineers, will bring together aerospace executives and scientists from throughout the United States to explore new developments in the field of flight control for aircraft, missiles and space vehicles.

CAPE KENNEDY: A Northrop Catalog

(Continued from page 2)

launches of the future.

Page communications contributions extend out from Cape Kennedy to many points. Nearby is a frequency analysis and control facility for Merritt Island and a downrange UHF air to ground system. Flashing out to other distance points are troposcatters at key locations in the Bahamas. At Petoria, Africa, is a telemetry antenna feed system.

And other communications links are provided by Underseas Cable Corporation (see story on page 3).

Northrop Space Laboratories is contributing OV2 satellites. Add to this the NSL Ranger and Mariner industrial support effort.

And each NASA astronaut polished his flight proficiency in the Norair-built T-38 supersonic trainer.

"This is a basic idea of Northrop contributions," Mr. McDonald said. "Break each of these items down and you come up with countless hundreds of others."

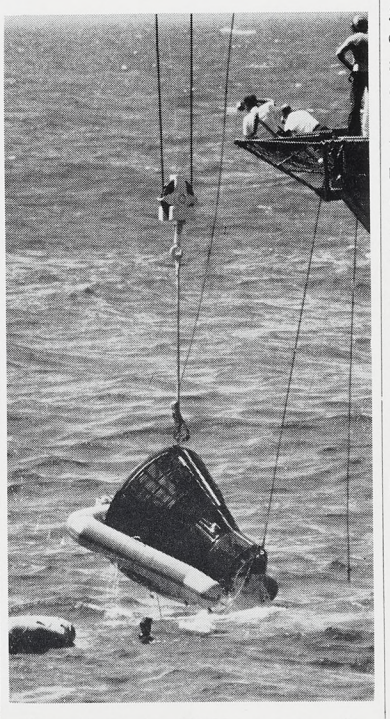
Naturally, there is the support of Cape Kennedy-based programs exercised from other points. That would be the NSL Huntsville operation as well as the Northrop-Brown and Root effort at NASA's Manned Space Center, Houston.

"Add them up any way you like, the total is impressive and extensive," Mr. McDonald noted.

Northrop will help Cape Kennedy, *nee* Cape Canaveral, celebrate the 15th anniversary of the first rocket launch from the Florida base July 24.

The first Northrop expedition departed for the Cape 13 years ago on the Snark missile project in what was to become a series of pioneering accomplishments.

Helicopter picks up one of Gemini IV astronauts from Atlantic Ocean after splashdown.



Aircraft carrier WASP prepares to hoist capsule which orbited the earth 62 times.

Zero Defects Program Launched at Norair

More than 7000 employees at Hawthorne and in the Antelope Valley joined two million persons across the nation last week in working toward Zero Defects.

The Northrop program, which began at Nortronics Precision Products Department, Norwood, Massachusetts, last winter, has been expanded to include Norair and Northrop Space Laboratories.

Kickoff ceremonies at Palmdale were held June 21 when employees from Edwards AFB joined those from the Palmdale facilities for briefings by top Northrop executives.

The following day, Norair and NSL shut down operations at 1 p.m. to gather in a newly erected stadium adjacent to Hawthorne Municipal Airport.

Key speakers were the Honorable G. E. Fouch, deputy assistant secretary of defense; Lieutenant General T. P. Gerrity, Air Force deputy chief of staff; Brigadier General J. A. Pechuls, deputy chief of staff of Air Training Command; Northrop President and Chairman Thomas V. Jones; Vice President and Norair General Manager Richard E. Horner.

Senior Vice President Richard R. Nolan was master of ceremonies.

Northrop set a precedent in its West Coast inauguration of ZD by inviting representatives of nearly 250 of its major supplier companies to participate in the program.

Approximately 500 heads of these companies and their deputies came from throughout the United States and Canada for a morning briefing on how to install ZD programs of their own. They were also special guests at the afternoon ceremonies.

At the afternoon ceremonies, employees learned that the ZD program encourages employees personally to prevent errors at their origin.

Training and education programs, as well as incentives, will be provided by Northrop to help sustain permanent momentum for ZD.

It was strongly emphasized that the new program is designed to complement the CMIP program rather than replace it.

According to Mr. Fouch:

" . . . In brief, Zero Defects recognizes the man, the woman, the person. It strips away anonymity. It helps make it possible for each person to come and go from our work daily with a sense of satisfaction and conviction that what is being done is worth doing."

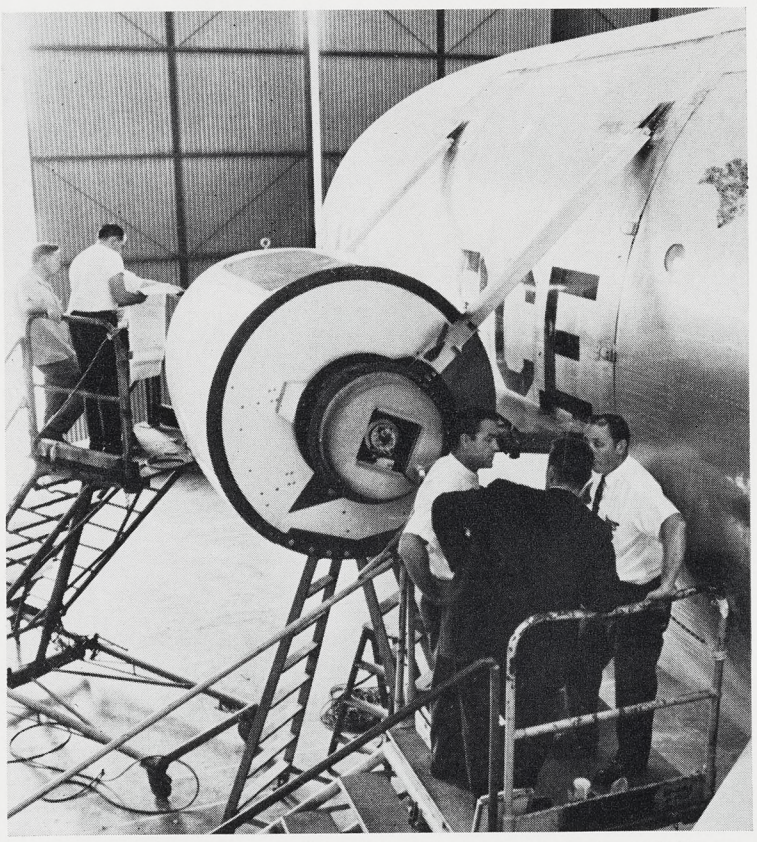
Malm Elected VP At Page Engineers

Dr. Robert E. Malm, director of Research and Development, has been elected a vice president of Page Communications Engineers, it was announced last week in Washington by Joseph A. Waldschmitt, president of the Northrop subsidiary.

As director of Research and Development, Dr. Malm is responsible for a broad spectrum of technical activity aimed at developing new system concepts and advancing the state-of-the-art in communications technologies.

Interest earned from your investment in U.S. Savings Bonds is not subject to state or local income taxes. Federal tax on E Bond interest may be deferred until you cash the bond.

NEARLY AIRBORNE



Nortronics-developed Airborne Lightweight Optical Tracking System (ALOTS), up to now tested only from ground stations, is presently being mounted on modified Lockheed cargo plane. Modifications and installation are in progress at Ontario Airport.

SYMPOSIUM PROBES PROSPECTS FOR CHECKOUT EQUIPMENT

Four Nortronics (Anaheim) technical experts from the Automatic Test Equipment section were active participants this month in a symposium sponsored in St. Louis by the Institute of Electrical and Electronic Engineers.

Will Peterson, director of the Anaheim section, was a session chairman. Papers were presented by John Shore, Noble Bishop and Irving Shedd.

The June 7, 8 and 9 symposium was on Automatic Support Systems for Advanced Maintainability and was hosted by Emerson Electric.

Nortronics is a leading developer and producer of automatic checkout equipment for the U.S. Navy.

Also attending the symposium from Nortronics were Paul Boggess of the Automatic Test Equipment section and E. J. Norman of the Marketing staff.

Put the pleasure of purchasing power in your future. Buy U.S. Savings Bonds today, where you work or bank, for security tomorrow.

Bright Future Predicted for Space Labs

Northrop's future in the space business is looking increasingly bright, according to Roy Jackson, vice president and assistant general manager of Northrop Space Laboratories.

Mr. Jackson

Featured speaker at the June meeting of the Northrop Norair Management Club, Mr. Jackson said, "We are most confident that we will get Northrop into the space business in a substantial way.

"We are doing well in competition," Mr. Jackson told the crowd of 326 executives. Looking to the future, he said, "We are pursuing areas of technical capability where we feel we offer something other companies don't."

Its achievements to date and plans for the future are in keeping with NSL's stated objective, Mr. Jackson said. This is, basically, to see that Northrop gets its fair share of available space vehicle business.

Describing the work currently going on at NSL, Mr. Jackson divided it into two areas: Research Laboratories and System Programs. Each of these contain two major areas—Life Sciences and Physical Sciences for the former; NASA and USAF for the latter.

NSL's Life Sciences research is directed toward man-in-space, his protection and his performance, and life-in-space, its existence and noncontamination. Mr.

(See JACKSON, page 5)

PIONEERS IN PARADYNAMICS: Part 2

What Goes Up Must Come Down—But Gently Please

By a Staff Writer

On its way to a perfect landing early this month, the Gemini IV space capsule passed Ed Ewing somewhere in the wild blue skies near the upper reaches of the earth's atmosphere.

That's where the earth's atmosphere is closest to simulating the environment in which future astronauts will have to land when they reach Mars.

That's where Mr. Ewing's thoughts are these days when he has a spare moment in his busy schedule as a research engineer at Northrop Ventura's Paradynamics Lab.

Mr. Ewing, who invented the Ringsail parachute which returned Gemini IV from its unprecedented 62-orbit flight, is one soft voice in favor of parachute landing systems on interplanetary spacecraft.

The canopy which he believes can do the job is now in development at Northrop Ventura for another purpose, but chances are pretty good he'll get an opportunity to test it in the low density atmosphere between 20,000 and 150,000 feet. That would be an approximate simulation of Martian conditions.

But a Martian landing is only one thought in Ed's inventive mind, which has been consistently productive for Northrop Ventura since 1947.

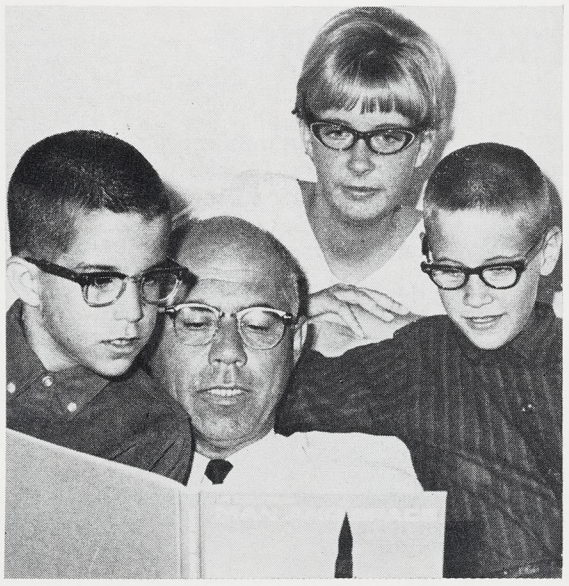
A former vice president of the Pacific Rocket Society, Mr. Ewing never lost interest in rocketry (he terms it an "avocation").

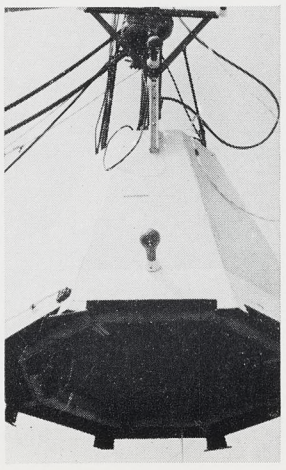
For the past couple of years he has been testing combination skirt jet-parachute landing systems, and this is one of the two concepts he feels will dominate the next era of recovery.

The skirt jet is a ring of small rocket nozzles which may be mounted on the bottom perimeter of a space vehicle. The concept involves using a smaller parachute, allowing the craft to descend faster, and firing the rockets a few feet from the ground for terminal deceleration.

The advantages, Mr. Ewing points out, are safer landing, greater accuracy through reduction in drift and, most

(See PIONEER, page 5)





Ewing children—Jimmy, Diane and Tommy—learn about rockets and parachutes from Dad, who is pioneer in both fields, in candid photo taken by Mom. At right is mockup spacecraft fitted with Ewing skirt jet on its base.

EDITOR'S NOTE: The NEWS asked Mrs. Ed Ewing, who is editor of the Conejo News "Living" page, to provide our readers with some insights as to what family life is like with a contemporary inventor.

By Maida Ewing

When one's husband is an inventor and designer with visionary tendencies, the usual domestic workload multiplies. As the lesser half of Edgar Ewing, I have found added to my role of housewife and mother the following assortment of tasks.

—Sewing experimental parachute models.

—Typing and retyping seemingly endless technical papers and engineering proposals.

—Playing secretary to his position as vice president of a rocket society.

—Being custodian of a mountainous library of science fiction.

—Going along on experimental rocket tests in the Mojave in 120 degree weather and "housekeeping" under the stars with rats and snakes.

—Being "guinea pig" auditor to provide first reactions for a new gadget or scientific theory.

But the time I remember most vividly was when he called me one Sunday noon in 1958 to say, "I'm down."

With cloak and dagger secrecy, he arranged to make the first overland jump with his newest "baby" the Skysail parachute and him with no previous jumping experience.

When the space explorer returned home, bruised but happy, he placated me with: "Once is enough, but I had to do it. I had faith in the chute and wanted to feel first hand the sensations a parachute jumper experiences. Testing my own chute gave me a legitimate excuse to find out."

It wasn't until then I found that while I thought him "out in the shop working," he had been rigidly exercising and training for the jump and boning up on how it is done. I still wonder today what I would have done had I seen him climb into the Skydiver's jump plane with the parachute on his back.

(See MAIDA, page 5)

Tactical Tests In Progress For Fighters

An extensive Air Force operational evaluation on the Northrop-built F-5 fighter is currently in progress at Eglin Air Force Base, Florida.

It is called Project Sparrow Hawk.

Performed by the USAF Tactical Air Warfare Center, this effort will demonstrate air-to-ground capabilities in a tactical fighter mission environment.

Six F-5s are involved, along with six Air Force F-4c "Phantom IIs" and six U.S. Navy "Skyhawks."

Flying the six F-5s in the project are seven veteran Air Force pilots. They received their check-out training recently at Williams AFB, Arizona, then ferried the fighters to Eglin AFB.

Maintenance is being provided by Air Force crews also trained recently at Williams AFB.

Thus, the Air Force evaluation will also provide a true picture of how well maintenance personnel can service the F-5 after receiving only minimum programmed training. Another key Sparrow Hawk objective is to determine exactly what it takes to support the F-5 under conditions of a simulated forward operating base.

For the measurement of weapons delivery, instrumented ranges at Eglin AFB are being utilized to record impact points in feet from standard references.

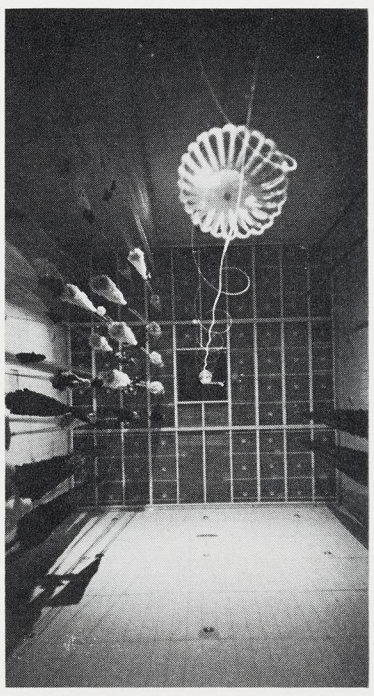
Directing Norair's efforts in support of Project Sparrow Hawk is L. A. Nelson.

Mr. Nelson pointed out that the program is an Air Force operation from start to finish under direction of the Tactical Air Command.

"Northrop is providing support, as requested, just as it would under operational conditions," Mr. Nelson said. "Naturally, we are keeping abreast of day-to-day results for future applications. To date, we have been well pleased with the performance of the F-5s."

Customer contact at Eglin AFB falls to Harry R. Evans, while J. J. Quinn handles feedback of information at Hawthorne for use of the project director, Marketing and Customer Relations.

Four Northrop technical representatives reporting to Gaylord Anderson of Product Support are on hand at Eglin AFB. They are D. R. Heywood, I. M. Houts, C. E. Johnson and Jim Bateson.



Rotafoil parachute, one of Ed Ewing's early inventions, is shown dropping in test chamber at El Centro in this decade-old photo.

MAIDA

(Continued from Page 4)

When I first met the man in the late 1940's (when astronautics was thought to be one step beyond the fantastic), rather than spend an afternoon at the beach with his bride-to-be, he was occupied with building a 10-foot model of a lunar spacecraft for the Pacific Rocket Society. Specifications of the rocket are still considered prophetic of post-Apollo developments.

Mrs. Ewing

When Ed designed the Ringsail he little dreamed it would be used to bring the Mercury space flights to a safe landing. Al Shepard's exuberant report, "It's a beautiful sight," moved him greatly, and each astronaut in turn has echoed those words.

As an inventor he constantly sees what can be done better and easier, and does it. Retiring to a complete workshop is his idea of heaven.

His newest "at home" project is designing a better surfboard. He tried one at Waikiki last year and found the boards being used more unwieldy than those he had made as a surfing youth. My only reservation is that this, like his parachute, will have to be tested, and I'll bet he has in mind doing it himself.

PIONEER

(Continued from Page 4)

important, the ability to land softly on rough terrain.

There are advantages over conventional retro-rockets, too.

"Such retro-rockets tend to blast furrows in the surface," he said, "and debris from the furrow is thrown back against the descending vehicle.

"The annular rockets of the skirt jet, first of all, do not need as much thrust because of ground effect cushioning and, secondly, they direct the jet flow outward away from the vehicle causing any debris to be thrown off to the side."

Mr. Ewing's (patent applied for) skirt jet could be used for spacecraft landing on soft surfaces, such as may be found on the moon, without the rocket power digging its own grave.

"The success of this type of LEM landing system does not depend on our having accurate knowledge of the lunar surface," he said.

Another leading candidate for landing systems of the future is a deployable gliding parachute of advanced design. The goal is a parachute system which will glide forward three to four feet for every one foot of descent.

If nylon and rockets seem an unlikely mix of materials for an inventor, consider some of Ed's other design contributions to recovery technology. There's an ejection mortar for parachutes, an explosive hatch ejector, a landing shock absorber, and a high pressure press for packing parachutes.

One of his earliest inventions, a Rotafoil parachute, is still used by Northrop Ventura for recovery of one of its target drones (RP-76). This design was for a fast spinning canopy giving extra drag and stability.

Mr. Ewing calls for an end to the discomfort of ocean landings for astronauts.

"A more dignified conclusion to such flights can be effected on any local airstrip with the Northrop Ventura gliding parachute and skirt jet landing systems," he said.

Maybe Ed is still thinking about his first and only jump but, regardless of the motivation, it appears obvious he is determined to make returning from outer space a safer and more comfortable experience for astronauts.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:30 a.m. — 4:15 p.m.

Highland & Marine, Manhattan Beach. L. Berg, ext. 2763, 672-5578. 3

8 a.m. — 4:45 p.m.

Main & Carson, Torrance. C. H. Vance, ext. 2313, 835-1031. 5

Rides Offered

8 a.m. — 4:45 p.m.

Main & Carson, Torrance. C. H. Vance, ext. 2313, 835-1031. 15

JACKSON

(Continued from page 4)

Jackson described experiments being conducted and special equipment developed and used in these efforts.

Studies in Physical Sciences center on materials in the space environment, concentrating on problems from vacuum, radiation, meteoritic impact, and re-entry. Among several highly advanced research "tools" used in this work are NSL's man-rated space chamber, TRIGA nuclear reactor, and plasma facility.

Systems programs described by Mr. Jackson included those for possible lunar and planetary exploration, for which NSL engineers have developed a vehicle with a unique mobility and suspension system.

He also reported on the status of the OV2 satellite program. NSL has developed and built one of these low-cost spacecraft and is working on the second. Developed under a fixed price contract, they represent a new approach to the production of space exploration vehicles. NSL is also conducting classified programs for the military that have significant potential.

Koletty Graduates From West Point

John W. Koletty jr., son of Colonel John W. (Jack) Koletty of Nortronics Marketing staff, graduated from the U.S. Military Academy this month.

Colonel Koletty (U.S. Army, retired) and Mrs. Koletty attended the graduation ceremonies and the wedding of the young second lieutenant which followed.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Refrigerator, Philco, 5′, about 7-yrs.-old, $50. Inglewood, 672-5578. A

Automobile Year, vo's. 1, 4, 5, 6, 7, 8, 9, $35. Costa Mesa, 545-3511. A

Chair set, 4 hvy. maple, captains, $34. Fullerton, LA 5-2767. A

Range, Crosley, elec., standard size, deep well cooker, $25. Torrance, 375-1756. A

Top Hamper, large size for auto, $15. L.A., 754-4384. A

Bed, single, wooden headboards; springs & mattress, $10. Box 1001. A

Mobile Home, 1964 Universal, 12x55 w/ living & dining rm. ext., 1-bdrm., furn., porch, awning, air cooler, $1300 dn. & take over pymts., $6428 bal. Anaheim, 772-5754.

Stove, 42″ Wedgewood Kook Center, yellow w/chrome top, 5-burner, oven & broiler, rotisserie, $150. Garden Grove, 537-6760. A

Renault Dauphine, 1960, recent o/haul, good tires, $395. Palos Verdes Est., FR 5-3202. A

Buick LeSabre, 1962 4-dr., sed., $2100. L.A., AX 4-1249. A

Swim Pool, Doughboy, 15′ x 36″, incl. vacuum & filter, $35. Torrance, DA 6-0340. A

Sloop, 24′ Herrshoff, 1961, built by Master Shipwright, teak decks, sleeps 3-5, inbd. eng., full cover, fully equipped, $6000. San Pedro, TE 3-6037. A

T-Bird, 1955, h/top, p/seats, p/wind, auto. trans., $900. Inglewood, 671-1879. A

House, 3-bdrm., 1-yr.-old, w/ocean & mountain view, family room, many extras, $33,800. Palos Verdes Pen., 377-5172. A

Sport Parachute, 28′ main, 5-panel TU, 20 jumps, 24′ reserve, $35. L.A., 477-9397.

Camp Trailer, 1960, Terry, 15′, $895. Torrance, 371-4876. A

Acreage, lake front, $3500 acre. Manhattan Bch., FR 8-2943. A

House, 4-bdrm., 2-bath, view, 15x30 patio, block wall, landscaped. Accept low down pymt. & 2nd trust deed, $21,500. Thousand Oaks, 805-495-3801.

Truck, International, 1961, ½-ton, p/s, new tires, 19,000 miles, $1100. Redondo Bch., FR 6-6415.

Wanted to Buy

Blower, VS 57 Paxton, used or rebit. Whittier, OX 3-4117. B

For Sale or Trade

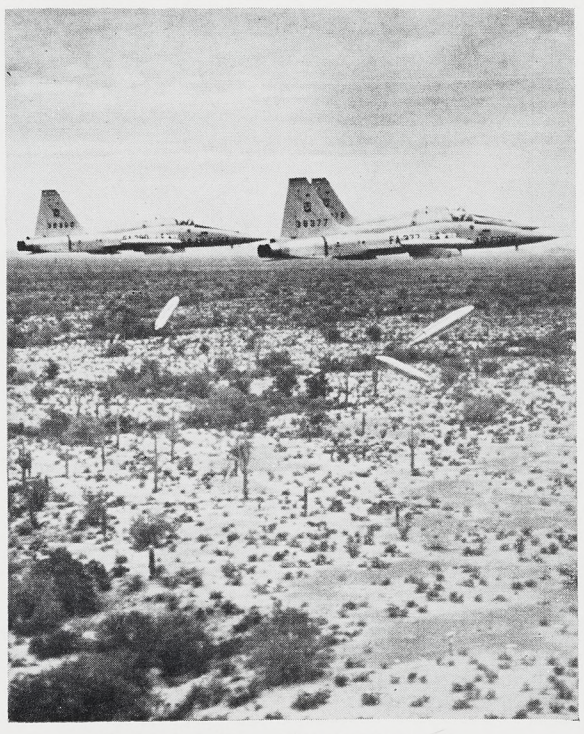
Corvair Monza, 1962 4-dr., r/h, auto., b/s, 1-owner, $975 or trade for late Cadillac. Alhambra, AT 4-5698. M

Falcon station wagon, 1960, 4-dr., r/h, w/w, luggage rack, stick shift, 1-owner, $800 or trade for 1962, 1963 Ranchero. Ventura, 805-643-9413. M

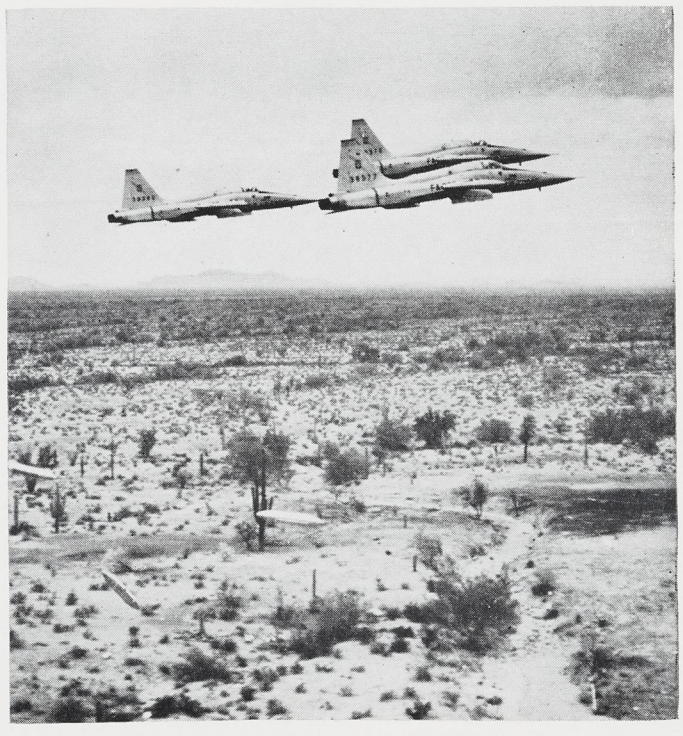
Encyclopaedia Britannica, my $250 equity for 35mm slide projector/screen or power edger. Palos Verdes Ests., FR 5-5097. M

Boys and girls who buy U.S. Saving Stamps easily learn a lifetime lesson of thrift with trust—on sale at many schools and all post offices at 10, 25 cents and up.

Moving in for Kill . . .



Pilots Deliver Their Bombs . . .



Another Sparrow Hawk Hit

Los Verdes Course Picked for July NRC Golf Tourney

Northrop Nortronics golfers, crowned winners of a June tournament this week are preparing to tackle the Los Verdes links July 10, starting at noon, for their regular event.

Entry forms for the July event are available through Personnel Activities office, according to Commissioner Dick Teel.

Jim Rutkoskie took low gross (74) in the June event. Dick Johnson won low net in the 6-16 handicap bracket with a 69, followed by R. E. Stone (72) and Virgil Wilson.

Second flight (17-20 handicap) honors fell to James O'Neill with a net 68. Tied for second with 71s were George Mahlman, Al Christensen and Tom Fujimoto.

Larry Laurinat won low net in the 21-30 bracket with a 65. John Nakakihara and Cliff Ross deadlocked for second with 70s.

HILTON LAKES DRAW FIRST HIKER PARTY

Northrop hikers and packers will hit the trail for the first time this year over the forthcoming July 4 weekend.

Destination is the Hilton Lakes, a chain of 10 lakes noted for fishing and beautiful scenery. The trailhead will be Rock Creek Road, just beyond Rock Creek store. Departure time is 9 a.m. July 3.

Detailed information is available through Dale Huss, ext. 1456, or Gordon Madison, ext. 2024, both Norair.

WHO'S ON THIRD—Nortronics (Hawthorne) all-girl softball team, which challenged four combined NRC male teams to a contest this month, didn't mind when opponent Roy Jackson attempted to steal third base. But when he ran into left field with it the melee above ensued. From left to right (more or less): Elaine Thumper Miller, Shirley Fumbles Fletcher, Elaine Fink Islas, Chris Cuddles Bolton, Connie Bos Moskos, Shiela Spas Haskins, and on the bottom is Roy the Culprit. Nineteen girls and 40 men took part in the action at Leuzinger High School.

FEMS TRIUMPH

Thumper Hurls Only 'Strikes'

Thumper Miller strode defiantly to the mound, slapped the round pink ball twice in her glove and peered past the cowering batter, Mark Hunter, to get her sign.

Behind the plate, Mighty Ammon snapped her black, gay-nineties garter twice.

Thumper went into her windup, then stopped. She walked over to umpire Art Valdez and appeared to whisper something in his ear.

Returning to the mound, she fired the first pitch past the batter. The ball soared six feet over the catcher's head and on to the backstop.

Umpire Valdez scratched his cheek and raised his lipstick smeared right hand into the air and bellowed: "Strike one."

The batter banged his bright pink bat on the plate. First baseman Bomber Krapf kicked the pink flowered base as she shouted encouragement to her teammates.

Thumper fired again. The ball bounced twice and stopped four inches short of the plate.

"Strike two," was the infallible call.

It was the beginning of the end when Whooze Hounds, the dastardly, all-male slo-pitch softball team fielded by Nortronics (Hawthorne) to accept the challenge of LuLu's Lovelies, a glittering collection of 19 females who eventually triumphed in the special match at Leuzinger High School diamond.

Co-managers J. McClanahan and L. Villalba used their entire 40-man squad in an effort to salvage the men's reputation as contenders for the NRC regular league title, but to no avail.

The June 18 game saw the Lovelies, who by day slave at the Hawthorne facility with little recognition, gain a measure of revenge, under direction of Manager Bobo Wilson.

Among the latest candidates for the Hall of Frames are: Babe Cawelte, Bos Moscos, Kookie Katzaroff, Cuddles Bolton, Sexy Lindgren, Sleepy Morrison, Slugger Bourbeau, Lulu Stapleton, Queenie Penner, Spas Haskins, Speedy Knoblauch, Fumbles Fletcher, Bubbles Smith, Tiger Haynie, and Fink Islas.

As for the males, they were happy to return to NRC league play, where they comprise four different teams and where they at least have a fighting chance.

Fortunately, antagonisms were washed away at a post game get-together at the NRC Clubhouse, according to NRC Slo-pitch Commissioner Bart Williams.

GUITAR: Instrument Work Of Art The Same as Music

(Continued from page 1)

nut for the back and sides and quarter-sawn spruce for the top. Elsewhere, he obtained gold-plated machined heads, ebony for the finger boards and German silver stock for the frets.

J. G. Rashid, a Nortronics employee and the designer and builder of violins, advised Roger on making the required special tools.

After careful study of references on fabrication techniques, Roger set to work. He steamed his wood over the kitchen range and inserted it into an assembly jig in just the right contours and curves. During gluing operations the entire assembly jig had to be kept at room temperature. So Roger brought it indoors to rest on his living room floor on cold nights.

Mr. Di Julio

"With five active youngsters about the place, there were some anxious moments," Roger recalls. "Another time warping material caused a re-do, but in the end everything worked out very nicely."

Following careful finishing Roger affixed six nylon strings and struck his first notes.

"The sounds were beyond my expectations. I really lucked out," Roger says.

Final tabulations showed he was out $50 and 200 man-hours.

While he is the lone member of his immediate family to play musical instruments, Roger comes from a long line of musicians. His grandfather organized and led European bands as a bandmaster for monarchs in years past. His father is a mandolinist and his uncle a symphony conductor and renowned clarinetist.

A five-year Northrop veteran, Roger is Nortronics (California) program manager of Overhead Technical Activities.

Roger is a "do-it-yourself" veteran, concentrating on very high direct labor-content projects where craftsmanship prevails. He's made his own stereo set, cabinets and a variety of unusual household furniture items. He concentrates on items he may not be able to normally afford, attaining personal satisfaction at minimum cost — a hard combination to beat.

BOATING WEEK

(Continued from page 1)

frequency. Do not substitute Citizens Band equipment. The Coast Guard does not monitor the latter.

2. Take one of the safe boating courses offered by the Coast Guard Auxiliary, American Red Cross, U.S. Power Squadron, etc.

3. Carry an inflatable life raft.

4. Have your boat inspected once each year by the U.S. Coast Guard Auxiliary, or Coast Guard "boarding teams."

Safe Boating Week programs are planned July 10 in Santa Barbara; July 10 at Marina Del Rey; July 3-5 at Redondo Beach; and at times to be announced locally at Newport Beach and Long Beach.

Jim Penrod, Bob Norton In New Jobs

James S. Penrod has been named director of Financial Planning and Controls and Robert J. Norton has been named director of Accounting, both in the Northrop Nortronics Finance department by D. L. Lewis, treasurer.

Succeeding Mr. Norton as chief of the Accounting group is Stanley B. Hawkins.

Mr. Penrod joined Northrop in 1962 and has been administrator of Accounting, controller at the Systems Support department, and director of Accounting prior to his new assignment. Previous to joining Northrop, he was with Rohr Corporation and Rheem Aircraft.

Mr. Penrod attended Southern Illinois University and UCLA.

Mr. Norton also joined Northrop in 1962 as a general supervisor in General and Cost Accounting and later served as chief of the same function.

A graduate of the Harvard Graduate School of Business Administration (MBA) and UCLA (BA), Mr. Norton was vice president of Custom Systems Corporation and director of Financial Forecast and Estimating at Pacific Automation Products, Inc., prior to joining Northrop.

PPD

(Continued from page 1)

since the ZD kickoff on January 14.

The Department, located at Norwood, Massachusetts, has received, as a result of all its programs, a craftsmanship award from General Dynamics / Astronautics for six consecutive months of supplying defect-free gyroscopes in support of the Advanced Ballistic Re-entry Experiment program.

Northrop relied a great deal on PPD's early experience with its ZD program in implementing, this month, a similar program at Norair and Northrop Space Laboratories in Hawthorne.

LONG SERVICE

Fred Stone (left), a coordinator in Nortronics' Operations Project Analysis and Reports, receives Northrop 20-year service emblem from Don Lewis, treasurer.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 11 | July 14, 1965

CIVIC LEADERS VISIT FACILITY AT ANAHEIM

An informal "Open House" for top Anaheim and Orange County business leaders, civic and government officials was held July 8 at Nortronics (Anaheim).

This annual affair has become a traditional means of acquainting distinguished guests with Nortronics facilities, organization, products, sales, personnel and community relations activities.

This year Frank Lynch, Nortronics vice president and manager—Operations department, extended personal invitations to 25 key officials to take part.

Guests were shown a product display and briefed by Mr. Lynch in a pre-luncheon gathering, then treated to lunch in the executive dining room.

Following lunch, guests were conducted on a tour of the Anaheim facility by Ray Schultz, director of Manufacturing.

JOHNSON NAMED TO HEAD OVERSEAS MARKETING EFFORT

M. E. (Skip) Johnson has been named to the newly created post of International Marketing manager for Northrop Nortronics, it was announced this week by Fred Stevens, vice president and general manager.

Mr. Johnson

Mr. Johnson will be responsible for all divisional new business activity in overseas markets. He will maintain his present offices in Washington, D.C., where he was Eastern Region Marketing director prior to his new appointment.

Bill Clark, formerly senior district representative in the Eastern Region, has been named to succeed Mr. Johnson as Eastern Region director.

Polynesian Motif

Those who like their entertainment and food in a Polynesian motif are invited to a special NRC-sponsored Luau set for August 7 at the Jungaluau Garden of the Palms, Orangethorpe and Raymond Avenues, Anaheim.

This annual NRC event is one of the highlights of summer recreational activities sponsored by NRC at Nortronics (Anaheim).

Computer in the Air Is Worth Two on Ground And It Has Scientific, Commercial Appeal

The Artists

The dedication and personal interest in doing a good job by a talented team—with an average seniority of 10 years—is credited with bringing Nortronics to the brink of a new era in computer technology.

Headed by Roy Kaufold, the group has a longer history than even the division for which they work. The men completed their first special purpose computer in 1951 in support of the Snark missile program at Northrop.

Among the old-timers are Roy Gaston, assistant group director; Walt Edwards of the Technical staff; Eddie Klein, chief of Computer Development; Lou Colombano and Lou Proctor, project engineers; Wally Pfeil, chief of Advanced Computer Systems; Ray McElroy, supervisor of Logic Design; Ed Powell and Neil Ebright, supervisors of Mechanical Design; Bob Sanders, supervisor of Computer Test group; Loy Spears, supervisor of Memory Development group.

Historically speaking, Mr. Kaufold believes the most distinguishing characteristic of the Computer group is its record of designing and building high reliable equipment on time.

"So many times," he related, "you read about computers which are being built to perform certain functions. But frequently the reliability is not in line with expectations.

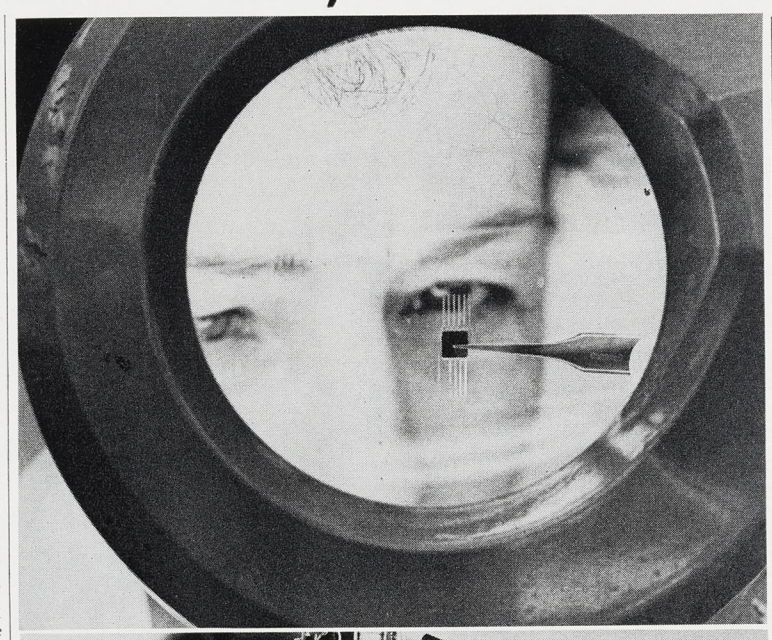
"Our computers include what is known as 'worst case design', which means that even though the machine is in use for long periods of time resulting in deterioration of components, its performance is kept constant.

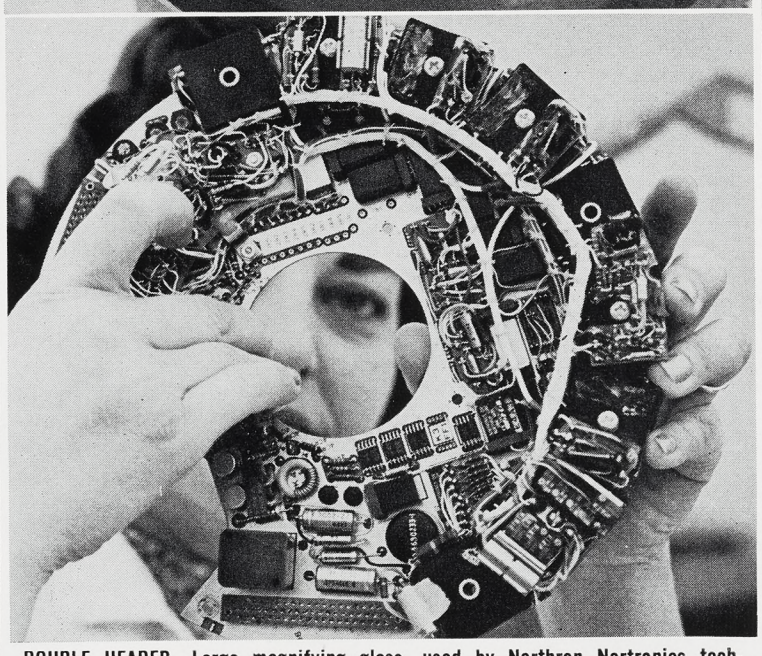
"The personal interest in doing a job well of the veteran nucleus of personnel has been carried forward through each level of the state-of-the-art and is a primary factor in recent advancements in computer technology made by Nortronics."

The group began its evolution when foundling computers were a mass of vacuum tubes and wires and the thought of getting one into an airplane was considered very difficult.

Northrop's initial contribution was the MADDIDA—the world's

(See GROUP, page 6)





DOUBLE HEADER—Large magnifying glass, used by Northrop Nortronics technicians to fabricate intricate mechanisms, frames attentive look of Mildred Russell (top photo), assigned to Computer group at Hawthorne. Peering through inertial ball assembly of a Northrop Inertial Platform (bottom photo) is Terry Annis of Engineering Development Support at Palos Verdes (stories on this page and additional photos on page 2).

State of the Art

A multipurpose digital computer—described as a low cost, compact airborne device suitable also for scientific and commercial use—is being developed by Northrop Nortronics.

Designated NDC 1051, the versatile electronic package is the latest computer development by the 128-man Computer group at Hawthorne.

NDC 1051 is small enough for a secretary to hold in her hands and has dozens of possible applications, according to Roy Kaufold, director of the group.

It is in that family of military computers presently being developed and used for navigation and fire control and within its capabilities are machine and process control, data processing and scientific computation.

Depending on the rate of production, the NDC 1051 could sell for three to 10 times less than current military computers performing the same functions.

Because of the many potential applications the 1051 is envisioned as an off-the-shelf item.

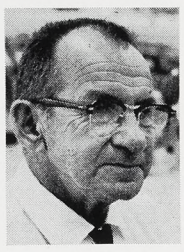
Initial production costs will be lower than equipment currently available, according to Eddie Klein, chief of Development in the Computer group. Mr. Klein is also responsible engineer on the 1051 project.

The 1051 includes military design requirements for operation in temperatures ranging from a minus 55 degrees C. to a plus 80

(See COMPUTER, page 6)

One-of-a-Kind is Best Hand For Mr. B.'s Support Group

"Take your problem to Mr. B.; he'll help you solve it," has become an off-the-shelf suggestion around Nortronics West Coast facilities.



Mr. Butler

Mr. B. is M. E. Butler, chief of Engineering Development Support at Palos Verdes.

The problem is how to transpose advanced concepts, plans or designs into working hardware on a one-of-a-kind basis.

This type of manufacturing is the result of a business environment in which advanced concepts and innovations are in constant demand and in which requests for proposals far exceed production contracts.

Mr. B. and his group of skilled technicians, which may number from 75 to 120, support engineers and scientists at various locations.

A special segment of the group has set up shop in the Hawthorne complex, and the highly flexible organization may perform work at other facilities belonging to Nortronics or a customer.

The support group was created in 1960 and is part of Technical Operations, headed by George C. Chalmers.

Mr. Butler is quick to disclaim personal credit, although he's worked for 23 years in Northrop

(See MR. B., page 6)

Antelope Valley Women to Host Northrop Social

An unusual "get together" of Northrop's feminine element, plus spouses, is being planned for July 23 at Lancaster by Northrop's Antelope Valley forces.

Plans call for a poolside gathering at the Caravan Inn with hospitality hours at 6:30 p.m. and a buffet dinner at 7:30 p.m. The cost is $4 per person. For those who'd like, room reservations will be made for overnight stays and a tour of Northrop's Palmdale facility scheduled for July 24. Special arrangements are being made for those who wish to change to the more casual attire for the poolside event, including swimming.

Dinner reservations must be made by July 16.

Accepting reservations are the following: Marian Wallace (Corporate office); Mary Delaney (Credit Union-Hawthorne); Naomi Va Nouse (Norair, Plant 4); June Curtright (Norair, Plant 1); Irma Baertschiger (Norair-Mariposa); Jean Keating (NSL); Maxine Berdan (Nortronics-Palos Verdes); Dottie Gallardo (Nortronics-Anaheim); Chilnessa Daly (Ventura); Henry North's office (NAS); Olive Cannon (Edwards AFB); and Carole Dufresne (Palmdale).

GIFT OF NRC

Rare Rocks En Route to Africa

Somewhere on the high seas this week en route to Langlaagte, South Africa is an unusual package — an 85-pound carton of rocks.

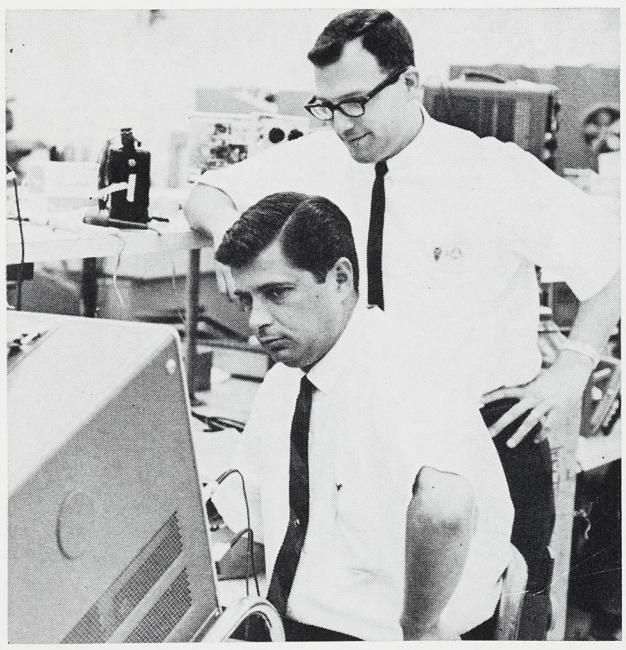
Not just rocks, but real mineralogical finds to help cement international relations, courtesy of the Nortronics (Anaheim) Gem and Mineral Club.

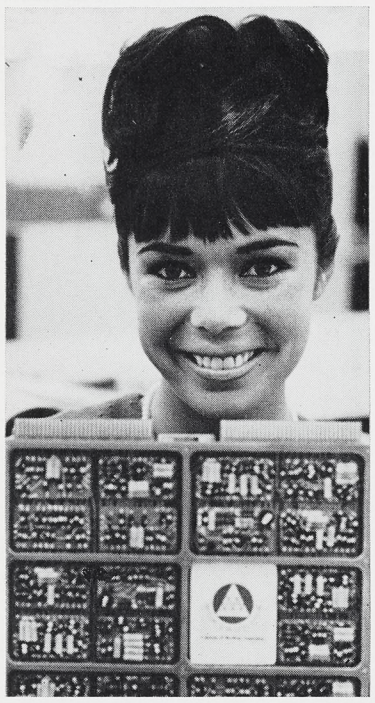
Recently, NRC Commissioner Bob Cornelius received a special appeal from L. G. Dovey, a teacher in a technical school in Langlaagte. It asked, in brief, if the Nortronics group could spare a few stones to help a young lapidary group get started.

Charles Brittenham accepted a job as chairman of a group attempting to answer the request. The results were gifts from many members, including some rare finds. One gift, for instance, was Howelite, found only in two places in the world — Newhall, California, and Nova Scotia.

The group completed the collection; Nortronics Shipping helped prepare the package and NRC footed the freight bill.

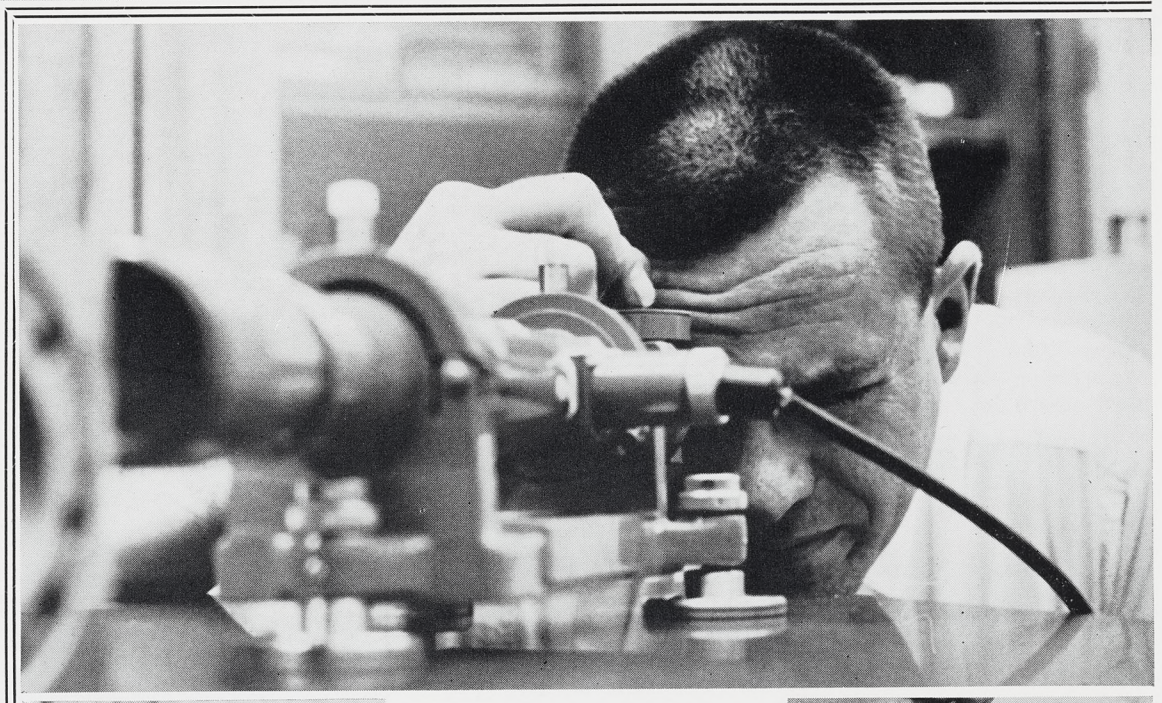
And somewhere in South Africa students will soon be working with raw material from the California desert regions.

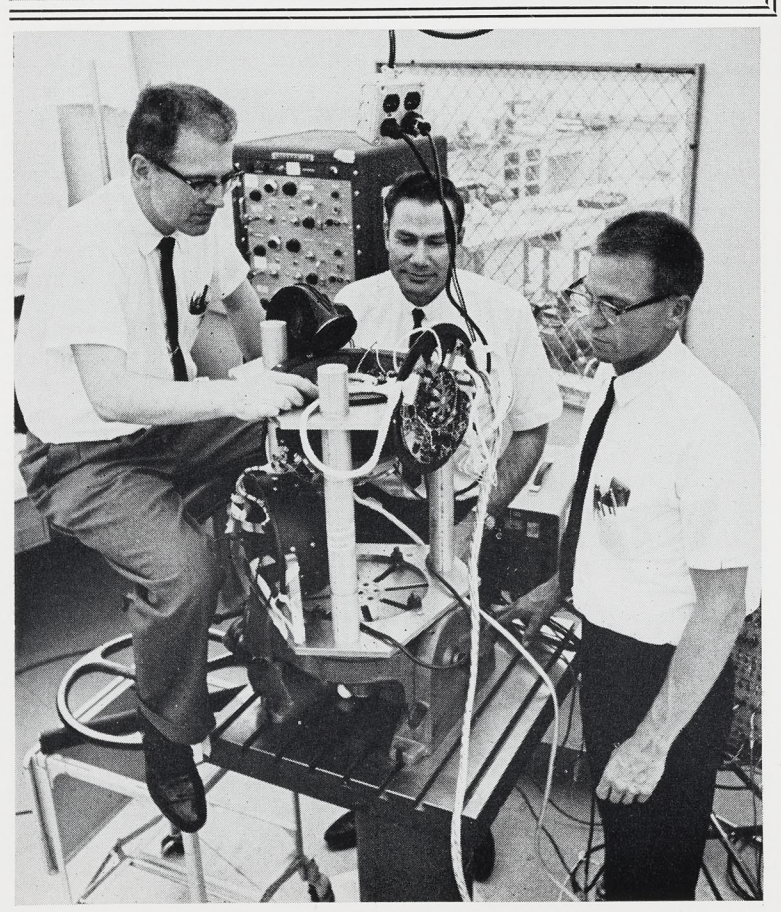


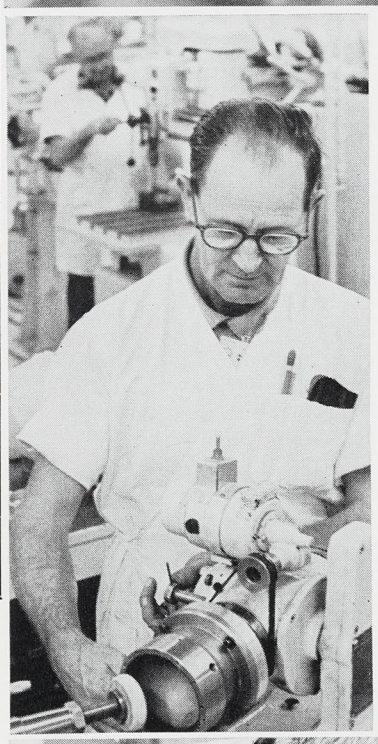


AROUND THE LOOP

On the heels of a sale of its NDC 1050A computer to the Air Force, Nortronics (Hawthorne) has announced the development of a multi-purpose digital machine, designated NDC 1051. With dozens of possible applications and small enough for a secretary to hold in her hands, the NDC 1051 is in the tradition of the Computer Group, which has produced pioneering military computers in support of Northrop products since the Snark program in the early 1950's. Production scenes (top of page) show part of operation which makes Group self-sufficient. Computer Development Secretary Sheila Moore (left) holds GAM-87 prelaunch computer, an earlier development by the Group recently modified for an aerial photo mapping system. Putting their heads together (below) for a NDC 1051 discussion are (from left): Roy Gaston, assistant Group director; Wally Pfeil, chief of Advanced Computer Systems; Roy Kaufold, Group director; and Eddie Klein, chief of Computer Development.

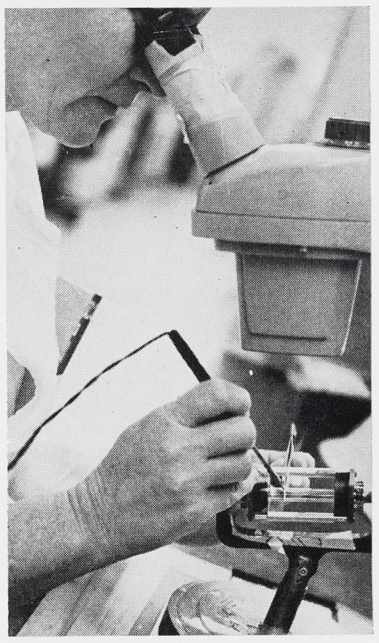


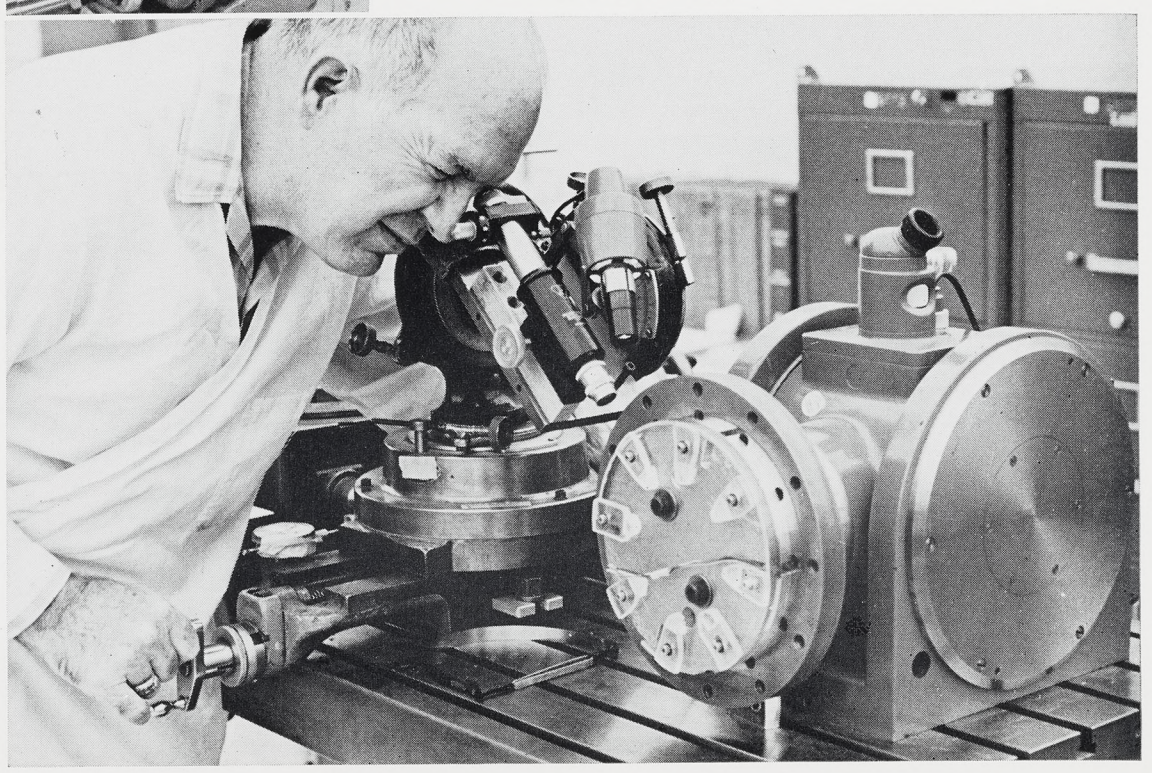




CALLING MR. B.

Engineering Development Support Group of Nortronics (Palos Verdes) is unique manufacturing operation which transposes advanced concepts, plans and designs into working hardware on a one-of-a-kind basis. Headed by M. E. Butler, known around Nortronics as Mr. B., the flexible group has the capability of setting up shop at any location as needed. In addition to its Palos Verdes operation, the Group supports the Computer Group at Hawthorne and frequently works at military test sites. The "eyes seem to have it" with R. E. Paramour (above), Anita Patry (right) and Claude Mallott (below left) as they use magnifying glasses for exacting work. In an engineering system performance test (below), F. H. McWaid, E. L. Horgan and R. N. Koerner (left to right) simulate operation of navigation equipment. Machine shop technicians, which include Bill Jackson (left), mold intricate parts for avante garde, one-of-a-kind products which may later become mass production items.





ARATA INSTALLED AS CHAIRMAN OF LOCAL AIAA

W. H. (Win) Arata, jr., this month is getting down to the business of heading the largest section of the American Institute of Aeronautics and Astronautics, following his installation June 24 as chairman of the 6500-member Los Angeles group.

A member of the Corporate Marketing staff, Mr. Arata was also honored at the dinner meeting as outgoing vice chairman-Meetings. He and Bill Oakes of Northrop Space Laboratories, the 1964-65 secretary, were presented plaques by outgoing chairman Maurice A. Sulkin.

Following the installation, members were treated to a discussion on the impact of automation on engineering and were introduced to revolutionary computer equipment from Massachusetts Institute of Technology and International Business Machines Corporation.

As 1965-66 chairman of the Los Angeles group, Mr. Arata will preside over activities involving more than 20 percent of the AIAA's national membership of 30,000.

More than 200 of Northrop's engineers and scientists are active members of the Los Angeles section, it was estimated by Mr. Arata.

Win Arata (left) receives plaque for year's service as AIAA vice chairman from M. A. Sulkin, outgoing chairman. Mr. Arata was then installed as chairman of the Los Angeles section for the coming year.

MODEL AERO CLUB SEEKING MEMBERS

A new group of model builders, the NRC Model Aero Club, has held initial organizational meetings and is seeking new members.

Next club meeting will be at 7 p.m. July 20 at the NRC Clubhouse, Anaheim.

ASTRONAUT TRAINERS—Northrop T-38, shown above in maiden flight with new paint job, is used by astronauts for flight training. Orange markings have been removed from trainers, which now are all white except for black section on nose to reduce glare for pilots.

Scientist-Astronauts To Get T-38 Training

Four of the six scientists-astronauts recently selected by NASA for the Manned Space program will begin a year of flight training this month at Williams Air Force Base, Arizona, which will include 120 hours instruction in the Northrop T-38.

The men were selected from a field of more than 1700 applicants who were screened by the National Academy of Science as well as NASA.

At a Houston news conference June 29, the future moon explorers described their upcoming role in the space program as filling the gaps left by instruments.

The four non-pilots—Dr. Owen K. Garriot, associate professor of physics at Stanford University; Dr. Edward G. Gibson, Newport Beach physicist; Duane E. Graveline, NASA flight surgeon; and Harrison H. Schmitt, an astrogeologist—have been ordered to report to Williams June 28, where they will join 60 other student pilots for a 53-week course.

Their training will include 300 class hours and 240 flying hours, NASA said.

The other two successful applicants, Dr. Frank C. Michel, a Rice University professor, and Dr. Joseph P. Kerwin, a Naval flight surgeon, are qualified pilots.

While NASA and the astronauts indicated specific experiform were undecided, they pointed out that the unknown factors of space will require more and more human involvement.

Astronauts in the Mercury and Gemini projects have also used the T-38 in their training program.

TOM McSWEENY EARNS NSF GRANT —THE HARD WAY

If Tom McSweeny appears to be walking on air lately, his fellow Northrop Norair employees are forgiving. Most feel he's earned the right many times over.

Mr. McSweeny

Thomas E. McSweeny has graduated Cum Laude with a degree in aeronautical and astronautical engineering; accepted a coveted graduate scholarship at Cal Tech; and prepared to hold down an engineering job with Norair this summer.

There is more to the story, of course.

Mr. McSweeny and his wife came to California from Minnesota in early 1962 so he could attend Northrop Institute of Technology. This month he graduated after posting a 3.667 grade point average, putting him at the top of his class.

Since May 1962, Mc McSweeny has worked full time in Norair's Mail services on the night shift. He has received assistance from Northrop's Education Refund program, since he met certain special criteria.

Word that he had been awarded a National Science Foundation Graduate Traineeship at Cal Tech came recently, a distinct honor for any student. He will receive full scholarship coverage while obtaining his master's degree.

"I would like to return to Northrop after completing my graduate studies," Mr. McSweeny said. "Then, in time, I would like to study for a doctorate."

Those familiar with his struggle to date have little doubt that Mr. McSweeny will follow through with honors.

Research Group Hosts AF Academy Grads, Cadets

Three recent graduates and six undergraduates of the U.S. Air Force Academy — participating in a summer research program at Northrop Nortronics' new Applied Research department in Newbury Park—are learning how industry conducts research.

While the move from Northrop Ventura facility is still in progress for the research group, its work is continuing. Transfer of the approximately 60 scientists, technicians and administrative men and women from Ventura to Nortronics was announced in early May.

The young lieutenants and cadets are getting their first glimpse of industrial research at the invitation of Dr. Donald A. Hicks, head of the research group.

Dr. Hicks, now a Nortronics vice president, made the open invitation during an address before the Air Force Academy Math Club in Boulder, Colorado, last year.

Most of the visitors gave up a good portion of their vacation to work beside Northrop scientists, according to Lieutenant Pat McDaniel, officer-in-charge of the group.

Lieutenant McDaniel will be seeing a lot more of Southern California. He intends to enroll at California Institute of Technology to work toward a master's degree in nuclear engineering.

Another graduate in the visiting group will also be staying in the Southland. Lieutenant Bill Hobbes has been assigned to Edwards Air Force Base.

Most of the visitors have a prior interest in the effects of electromagnetic radiation, a principle line of investigation by the Nortronics department.

Part of the group became familiar with Northrop aircraft during a visit of the Math Club last year to Edwards Air Force Base.

While Northrop is the only corporation cooperating in such a program, other cadets and graduates are working this summer at NASA's Manned Spaceflight Center at Houston, and at Wright-Patterson Air Force Base in Dayton, Ohio, a major Air Force research center.

NRC BOOKS THEATRE FOR 'SOUND OF MUSIC'

Northrop Recreation Clubs have joined forces to "buy the house" for a special all-Northrop night to see the Rodgers and Hammerstein motion picture of "Sound of Music."

The date is August 8. The time, 7 p.m. The place, Fox Wilshire Theatre in Beverly Hills.

Because NRC has reserved the entire theatre just for Northrop folk, tickets are being offered at a reduction over normal rates. Each ticket sells for 50 cents below commercial rates. Employees have a choice of $2.50 or $3 seats which includes the reduction. All seats are reserved.

Tickets went on sale this week throughout Northrop West Coast facilities. They may be obtained from regular ticket outlets.

UCLA Names Getz Guest Lecturer

Clyde Getz, chief engineer, Special Projects section of Northrop Nortronics (Hawthorne) will be a guest lecturer in a two-week UCLA short course beginning October 4 on automatic checkout techniques for aerospace vehicles.

The university extension program, which will cover the philosophy as well as hardware requirements of automated checkout equipment, will run from 8:30 a.m. to 4:30 p.m. Monday through Friday.

Stamp Club Hosts

Northrop Stamp Club will hold a joint meeting with the Hollywood Stamp Club at 7:15 p.m. July 19 at the NRC Clubhouse, Hawthorne.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:30 a.m. — 4:15 p.m.

Marine & Highland, Manhattan Beach. Louise Berg, ext. 2763. 3

8 a.m. — 4:45 p.m.

Springdale & Edinger, Huntington Beach. Robert Forshner, ext. 1120, 893-7976. 5

Rides Offered

7 a.m. — 3:45 p.m.

Avalon Blvd. & 190, Gardena. Genaro Chapa, ext. 2568, DA 3-9447. 12

8 a.m. — 4:45 p.m.

Springdale & Edinger, Huntington Beach. Robert Forshner, ext. 1120, 893-7976. 15

Small enough to become habit-forming; large enough to add up quickly, the $25 "Series E" U.S. Savings Bond—purchase price, $18.75—is a big beginner for the steady saver.

BUT PLENTY OF 'EARTHLIGHT'

There's No Moonlight for Lunar Explorers

That symbol of romance and rapture — moonlight — will undoubtedly be on the minds of future astronauts exploring the lunar surface — but for an unromantic reason.

Because the moon has no atmosphere, the intensity of light during periods of direct sunshine causes completely dark shadows, which may hide dangerous craters. Glare inside the lunar vehicle would also affect astronauts' ability to see and would cause physical discomfort.

These and other special problems of illumination for man and his equipment on the moon were outlined June 22 at Houston by Trevor Robinson, formerly of Northrop Space Laboratories, now with the Condor program at Norair, at the 1965 Aerospace Technical Conference and Exhibit of the Institute of Electrical and Electronic Engineers.

At night, natural illumination on the moon comes from "earthshine," which is sunlight reflected by the earth. Earthlight on the moon, however, is more than 60 times more intense than moonlight on earth, Mr. Robinson pointed out.

"During minimum earthshine, a man with good vision would just barely be able to see colors and distinguish normal print," he said.

In addition to the need for some means of projecting light into shadow areas, Mr. Robinson said that windows, shades, screens and interior cabin finish of the lunar vehicle must be coordinated with visual tasks required.

The technical paper covered research performed in conjunction with NSL's full-scale mockup of its lunar surface vehicle and a one-sixth scale model of the moon's surface, made with the aid of Ranger photographs.

Lunar lighting conditions were simulated on the lunar surface replica.

'Work Experience' Roll Grows to 20 Students

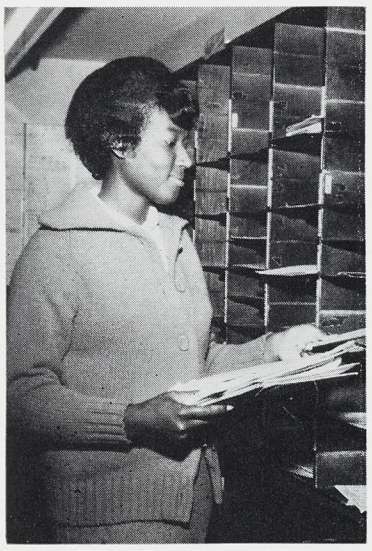
Northrop Norair has once again increased its support of a unique program affording select high school students a rare opportunity to observe modern industry in operation.

Norair began its association with the program, called a Work Experience Program, last February by accepting four students. In April this number was doubled, and last week grew to 20 student participants.

Northrop is the first major Los Angeles area firm to take part in the program.

Los Angeles City School System instituted the program as a means of encouraging participants to take courses that will better equip them to secure jobs in industry following graduation. Toward this end, only students in their junior year are allowed to take part.

Each student spends half of a school semester in on-the-job training, then completes the semester by attending related classroom studies. Each is graded and receives full credit for program participation.



Ruth Robbins (above) has landed summer job at Norair after taking part in Work Experience Program for high school students.

Students reporting to Norair work from 8 to 10:30 a.m. in such functions as Mail Services, Tooling, Fabrication, Communications, Personnel, Fabrication Dispatch, and the Technical Library. Normally, they spend two weeks in a function, then shift to another.

Participants are normally divided between girls and boys. Initially, all hailed from Manual Arts High School. Currently, the group includes Manual Arts and Dorsey students and in the fall students from Leuzinger and South High Schools will join the Norair part of the program.

"Northrop recognizes this program as an opportunity to fill a worthy community need and, more important, lend a helping hand to our future citizens," said Paul Crews, director of Industrial Relations.

C. Z. Stine, supervisor of Industrial Training and Norair administrator for the program, indicates students quickly form important conclusions, based on their work experience, as to courses they need to enhance their chances for good jobs later.

Program advisors at Norair have included Jo Roth, Robert Keating, Louise Hobson, Ben Chinn, John Fink and Dona Page. Nate Jackson represents the Los Angeles City School System.

Those who have supervised the students have found them extremely interested and willing. Mr. Keating noted most "are eager for knowledge and appreciative." Miss Page found them attentive in Personnel assignments and "well versed in the value of their studies." Shirley Markley of Communications reports the students "cooperative and interested," and Mr. Chinn adds that most adults "learn something in their association with the youngsters."

Ruth Robbins of Manual Arts was among the first students taking part in the Norair training. On the strength of her ability and willingness to work, she has landed a job as a Norair summer hire in Mail Services.

"All of the students at our school know of the program and many would like to take part," Miss Robbins said. "This is my first real job and important to me. I know now the type of studies I must follow to get a good job."

Handful of Openings Left on Europe Tour

A gathering of Europe-bound travelers who will take part in an NRC-sponsored excursion in October has been set for 7:30 p.m. July 27 at the NRC Clubhouse, Hawthorne.

Movies of the last European trip will be shown and special information will be supplied those already signed up or interested.

Only about six places remain open on the tour. Information is available through Personnel Activities offices at all Northrop installations.

Don Hicks (right), son of Richard W. Hicks, of Norair, prepares to make one-hour flight with NRC Flying Club member Don Murray. Flight is door prize offered monthly by club, which meets the third Thursday of every month at NRC clubhouse. Club is also beginning monthly classes in flying for youngsters.

Changes Being Accepted In Salaried Savings Plan

Participants in the Northrop Salaried Employees' Savings Plan were reminded this week by Industrial Relations that the time is at hand when changes in personal contributions to the Plan may be made.

Such changes will be based on the participant's salary in effect May 1, 1965, and must remain within the allowable two percent minimum and five percent maximum range.

Requests for changes will become effective August 1, 1965.

Change cards must be completed by the individual and filed with Industrial Relations on or before July 23, 1965.

Change cards are available at Northrop Norair in the Personnel office or the Compensation Administration branch office, Engineering Science Center. At the Corporate office cards are available through Industrial Relations.

At Northrop Ventura cards are available at the Employee Relations and Compensation group office. Nortronics cards are available at Employee Services functions at Hawthorne and Anaheim; at the Palos Verdes Personnel office; and Cape Kennedy Administration office.

TWO AF OFFICERS FINISH TRAINING WITH NORTHROP

Two Air Force captains, Thomas C. Becker, jr. and Ora L. Simpson, jr., have departed following a 10-month tour of duty at Northrop under auspices of the Air Force Institute of Technology Education With Industry program.

Captain Becker is reporting to the Los Angeles Contract Management District at Inglewood, while Captain Simpson shifts to the C-141 System Program Office at Wright-Patterson AFB, Ohio.

Both officers reported to Northrop last September for a program which saw them concentrate on the management aspects of industrial planning and procurement. Each spent time working closely with Northrop personnel at the Corporate office, Norair, Northrop Space Laboratories, Nortronics and Ventura.

F. W. Lloyd, Norair vice president and assistant general manager-Operations, presented each officer with a Northrop certificate of completion prior to their departure.

Harry Blocher, supervisor of Training Equipment, was administrator of their training program at Northrop.

INDOOR EVENT SET FOR NRC MODELERS

"Pilots" of indoor rubber-powered models are being invited to take part in a Norair Modelers meet set for 7 to 10 p.m. July 16 at the Lawndale High School boy's gymnasium, according to N R C Commissioner Earle L'Homme.

All types of indoor models will be flown with no organized competition, although ribbons may be distributed by Jim Richardson.

LETTERS

Editor,
THE NORTHROP NEWS

With great interest I read the ZD Special Edition which came out June 21 in advance of our big rally.

As I scrutinized the credits given to people responsible for the preparation of the Inaugural Day, it became obvious that Graphic Services, under the direction of Mr. John R. Bellevue, was not to be recognized.

We, of Graphic Services Production, were particularly disappointed, because for the past six months we have created the typing, varityping, and art work for this important program, under the guidance of Mr. Max C. Windmiller, our supervisor.

Graphics Administration, Photo Lab, Motion Pictures, Lithographic Services and Reproduction, under the supervision of Dick Lake, Harold Pershing, Larry Grabert, Bill Wyper, and Bill Posey, respectively, were responsible for producing the finished products.

Mr. Editor, sir, I suggest that for some unfathomable reason, we were overlooked.

Ruth F. McCluskey
Typist Compositor Lead
Organization 1159

(Editor's Note: Ruth, we are crushed. You have found a defect in what we meant to be a perfect edition. Even so, thank you for calling this oversight to our attention).

Final Call for Frisco Sounded by NRC

Final call for Northrop employees interested in an all-inclusive package trip to San Francisco July 30-August 1 was sounded this week.

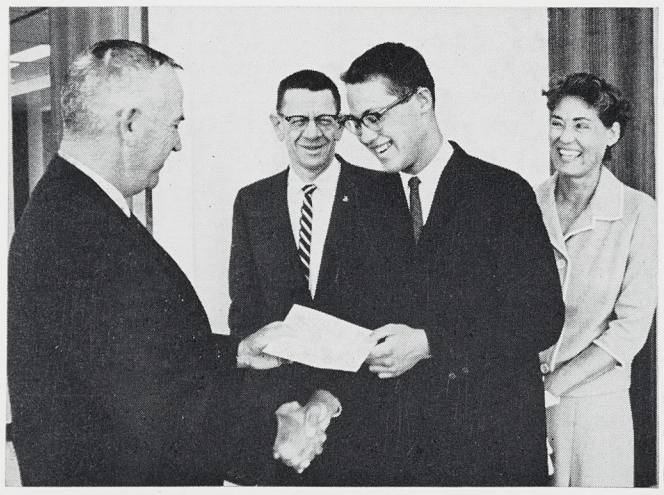
The total cost is $53.85 per person and includes round trip jet transportation, two nights' lodging at the Fielding House, a choice of two tours (family-type tour or night club tour), and gourmet dining (17 restaurants to select from) at two for the price of one.

Reservations are now being accepted at Norair and Nortronics (Hawthorne) Personnel Activities offices. Full payment is due tomorrow, July 15.

Need a $5000 nest egg? Buy a $100 "Series E" Savings Bond, once a month, where you work or bank (purchase price, $75). In five years, you'll have $4856 in cash value.

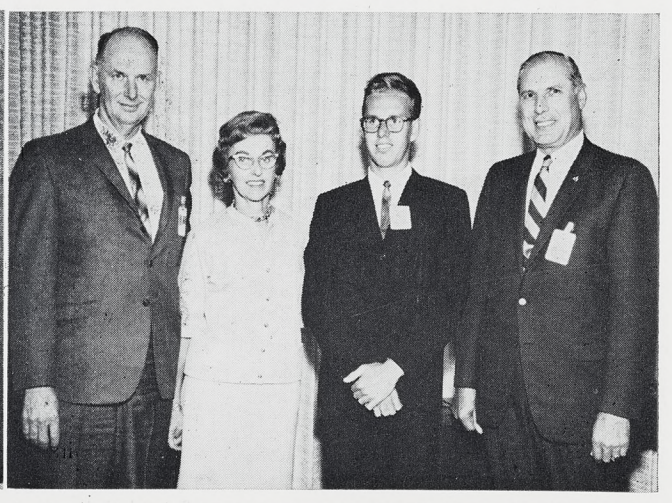
ONE . . . TWO . . . THREE . . .

. . . NORTHROP MERIT SCHOLARSHIPS ACCEPTED BY DIVISION EMPLOYEE'S CHILDREN . . .



Vice President and General Manager George Douglas presents certificate to Robert William Dedon in presence of scholar's parents at Northrop Ventura.

Mr. Douglas had privilege of making presentation to the only young lady among the eight winners, Alice Cordell, with Mr. and Mrs. Edward L. Cordell attending.



At Hawthorne, Mr. and Mrs. Bert Cook (left) and Quality Control Manager Bob Catlin flank one of Norair scholars, Doug Cook, at ceremony. Doug's father works in Quality Control.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Cedar Chest, $5. L.A., 754-4384. A

Belt Massager, Formette, $20. Inglewood, 675-0521. A

Bicycle, boy's, 26″ 3-spd., gears shift on hand grip, new gears, drop bars, $20. L.A., 292-4958. A

Stove, reconditioned, used only 2 mos., $38.50. Inglewood, 672-8830. A

Movie Camera, 8mm Revere turret, Wollensak lenses, type A filters & leather carrying case, $40. Hawthorne, 675-8413. A

Dinette Set, table w/center leaf & chairs, $15. L.A., 291-7715. A

Surfboard, 9′6″ Dewain, blue metal flake, ding proof, $60. Redondo Bch., FR 4-2915. A

Cemetery Plot, 2, Inglewood, Greenlawn section, $700. Hawthorne, OS 6-8842. A

Home, 5-bdrm., 1¾ bath, redec., lge fenced yd., walking distance to stores, schools, $22,500. W. Fullerton, 595-3429. A

Home, 3-bdrm., family rm., 2 bath, fireplace, unobstructed view, fenced, landscaped yard, 1-yr.-new, $34,700. Palos Verdes Pen., 377-5172. A

House, 3-bdrm., fireplace, link fenced, fruit trees, patio, garden, ½ acre, 90 rose bushes, $35,000. Thousand Oaks, 805-495-3449. A

Chevrolet, 1948, 6-cyl. flathead eng., need vac. unit on stick shift, $50. Hawthorne, 675-6291. A

Organ, Baldwin model 40 Orga-Sonic, w/ percussion, Philippine mahogany w/matching bench, $695. Redondo Bch., FR 5-3914. A

Lot in Inglewood Cemetery, 2 adjoining, incl. perpetual care, $1000. Huntington Bch., 714-897-7166. A

MG-TF, 1500 cc, good eng., new top, brakes & clutch, wire wheels, 70,000 act. miles. $675. Manhattan Bch., FR 2-0540. A

Dishwasher, Lady Kenmore, coppertone, w/ formica top, 3-cycle, lge. capacity, $140. Torrance, 835-3985. A

Mini-Bike, 6-mos-old, $110. Long Bch., 424-5992. A

Stove, elec., $30. Inglewood, 672-5798. A

Bed, Babyline, white, adjustable sides, spring, $15. Gardena, 329-9484. A

MG, 1961 convert., 1600 series, $1395 Torrance, 378-3788. A

Accordion, 120-bass, $125. Gardena, DA 4-0158. A

Camera, 35mm Argus C4, f2.8 lens w/case & b.c. flash, $30. L.A., 670-2564. A

Range, O'Keefe & Merritt, double oven, grill, $65. Gardena, 675-1005. A

Refrigerator, Coldspot, $20. Hawthorne, 679-4359. A

Pool, 18′, Doughboy, minus liner, filter, ladder & skimmer, $75. Hawthorne, OS 6-3886. A

Step End Table Set, w/drawer, Kroehler burnished mahogany, $35. El Segundo, EA 2-0678.

Window Set, 4 3′ x 4′ louvre-framed, 3 w/ screens, $44. Manhattan Bch., 376-4787. A

Projector, Kodak Cavalcade 35mm, auto. w/ 500 watt bulb, $75. Torrance, 371-9730. A

T-Eird, 1955, porthole top, 1957 Pontiac eng. & trans., $1350. Anaheim, 714-JE 4-8982. A

Bicycle, boy's 20″, $15. Inglewood, PL 5-4497. A

Bathing Suit, gold lame, size 10, De Weese, never worn, $10. Hawthorne, 671-3154. A

For Sale

T-Bird, 1962, pink, black int., p/w & seat, 30,000 mi., new tires, $2000. Redondo Bch., FR 5-3257. A

Chevrolet, 1960, pickup, lge. bed, hvy. duty, $750. Hawthorne, OS 5-2403. A

Roto Tiller, 4 hp Briggs & Stratton, enc. housing, forward & reverse, $90. Gardena, 370-6472. A

Ford station wagon, 1956, V-8 eng., stick shift, o/drive, new clutch, valve & ring, $150. Hawthorne, 679-5398. A

Aquarium, 10-gal., w/stand, lights, heater & misc. equipment, $25. Torrance, FA 0-1897.

Volvo 544, 1963, low mileage, all extras, new tires, $1500. Redondo, 378-0158. A

Muffler, Abarth, for late model VW, $25. Torrance, 371-8939. A

Bedspread, Heirloom, full size, white, reversible, $5. Torrance, DA 9-3721. A

Washer-Dryer Combination, gas, needs repair work, $50. Inglewood, PL 5-5149. A

Carpet, 40 yds. solid all wool frieze, plus 4 bound scatter rugs to match, $150. Gardena, 327-4791. A

Mustang, 1965, take over $88 mo. pymts, $2800 bal., Gardena, 676-5505. A

Plymouth station wagon, 1957, $225. Inglewood, 673-1097. A

Record Player, stereo, blonde, Decca, $100. L.A., PL 6-3025. A

Cabin Sites, 5-acre, near Willow Springs, Calif., $1750. Rolling Hills, 325-3057. A

Living Room Set, 5 upholstered pcs., 3 cherry tables & 21″ TV, $250. Palos Verdes Pen., 377-6149. A

Pool, plastic, 18′ x 4′, ladder, filter, center drain, new frame & cover, $200. Huntington Bch., 714-842-1733. A

Beagle, 15-mos.-old, female, AKC reg., $70. Palos Verdes Pen., 377-5724. A

Surfboard, Jacobs 9′, 3 stringers, pigment, reinforced nose & tailblock, 6-mos.-old, $70. Torrance, 371-8638. A

Chevrolet, 1956 sedan, Powerglide, good tires, $350. Long Bch., GA 3-1363. A

Austin Healey Sprite, 1962, red, $1100. Palos Verdes Est., FR 5-5139. A

Boat, 16′ ½″ Wizard fibreglass, near new Johnson 75 hp motor, complete w/trailer, $1500. Gardena, DA 3-6366. A

Crib, w/mattress, white, convert to youth bed, $15. Hawthorne, 675-5654. A

Lawnmower, Sears, power, used 6 times, $65. L.A., 478-7551. A

Organ, antique parlor-type, oak, refurbished bellows, simple design, $100. L.A., 274-4865.

Chevrolet, 1957, $950. Torrance, 370-4747.

Racing Wheels, 4 12″ mag., Halibrand, never used, $80. Redondo Bch., FR 8-8815. A

Pool, Doughboy, 12′ dia., 3′ deep, comp. w/ filter, skimmer, vacuum & ladder, $50. L.A., EX 7-0366. A

Tires & Tubes, low mil., 3 5-ply, 6.70x15 nylon, $20. Torrance, 835-9486. A

Chevrolet, Impala S.S., 1963, factory air, 327 eng., r/h, p/s, p/b, $1875. Granada Hills, 363-2113. A

Bedroom Set, light wood, bed, dresser, mirror, night stand, $65. Gardena, DA 9-9195.

Chevrolet, Impala sport cpe., 1958, 348 cu. in., eng., p/s, r/h, new w/s/w, many extras, $725. Hawthorne, OS 6-4915. A

Dresser, w/detach. framed mirror, maple, 9 drwrs., $40. L.A., GR 3-3168. A

MG midget, 1964, British racing green, extras, radio, $1800. El Segundo, 322-6550. A

Chevrolet, Bel Air, 1957, 2-dr. h/top, r/h, new trans., 50,000 orig. miles, $550. Hawthorne, 371-0194. A

Volkswagen Camper, 1958 body, 1964 chalet camper int. w/tent, stove, 12-gal. water tank, & other access., $1200. Hawthorne, 675-4505. A

Triumph 4, 1963, 22,000 miles, new tires, wire wheels, $1700. Inglewood, OS 6-1475.

Bicycle, boy's 28″, $5. Hawthorne, OS 9-8644. A

MG, 1957 h/top, $700. Inglewood, OS 6-0049. A

Lot, single, Inglewood Parkview cemetery, $550 plus transfer fee. Torrance, TE 5-2128.

For Sale

Swim Pool w/ cover, trophy, 4′x15′, used 3 mos., $50. Manhattan Bch., FR 4-8036. A

Dodge Dart, 4-dr. sedan, 1964, 145 hp, auto., r/h, 24,000 miles, $1750. Anaheim, 735-1232.

Camper, cabover, self-contained, many extras, built on 1959 Ford, $2900. Redondo Bch., 374-1589. A

Windows, 3 double-hung, w/balancers, 36″x 42″ & 1 standard door, $9. Hawthorne, OS 6-1018. A

Studio Couch, $20. Inglewood. OR 8-1692. A

Tires, 2 4-ply 6.50x13 nylon tubeless, never used, $24. Torrance, FR 4-4953. A

TV, 21″ table model, $30. Torrance, FA 8-3306. A

House, 2000 sq. ft., 3-bdrm., 3-bath, family rm., corner lot, $41,750. San Pedro, TE 1-2973. A

Air Conditioner, 1964 Chrysler Airtemp, 18,000 BTU, 220 volt, $225. Hawthorne, 675-2395. A

Boat, 25′, bridge dual controls, lge. bait tank, $1500. Hawthorne, OS 5-7729. A

Washer-dryer, 1961 Westinghouse, operates on 220 volts, $32.50. Buena Pk., TA 8-2857.

Shaver, Schick 10-66, 3-spd., adjustable heads, $8. Torrance, 371-9651. A

Range, gas, O'Keefe & Merritt 4-burner, griddle & oven, $45. Torrance, FR 1-2381. A

Stereo Hi-Fi Components, AM/FM tuner, dual amplifier & preamps, 4 speakers, stereo turntable, $65. Hawthorne, 676-0418. A

Bedroom Set, walnut, dble. bed, mattress & box springs, vanity, night stand, $60. Hawthorne, 675-2514. A

Pontiac, 1957, 2-dr. sp. coupe, chrome rims, new brakes & battery, $350. Torrance, 325-2292. A

Mercury, 1956, new trans., $200. Hawthorne, OS 6-0264. A

Cartop Carrier, adjustable, custom-made, $40. Gardena, DA 9-5564. A

Go-Cart Chassis, factory-built, seat pad & back, gas & brake linkage, steering, eng. mounts installed, eng. available if desired, $30. L.A., 476-1635. A

Volkswagen, 1964 low mileage, heater, seat belts, $1550. Gardena, 436-3900. A

Lounge, Mak-a-bed & super mattress, $150. Hawthorne, 676-8282. A

Home, 3-bdrm., spacious & modern, close to city, lge. living room, den, 2 baths, beach rights in La Costa Beach Club, may take second, $54,900 or lease. Malibu, 456-2625.

T-Bird, 1960 auto., r/h, chrome mag. wheels, new tires, $1300. Long Bch., HA 5-9532. A

Sailboat, 19′ Lightning class, 2 sets of sails, trailer, extras, $800. L.A., OR 0-3713. A

Radio, comb. stereo & AM/FM, 1-yr.-old, $250. Reseda, 343-6948. A

T-Bird, 1959, full power, $895. San Pedro, 547-3490. A

Cadillac, 1961, convert., full power, $1900. Redondo Bch., FR 5-2747. A

TV, Zenith portable, 19″, 2-yrs-old, $70. Hollydale, ME 3-2395. A

Ford Fairlane, 1958, auto. trans., p/s, new w/w tires, new radiator, points, plugs & voltage reg., $350. Manhattan Bch., FR 2-1945. A

Plymouth, 1956 6-cyl., p/s, auto. trans., 4-dr. sedan, $150. L.A., 620-2762. A

Bassinet w/mattress, white, $4. Hermosa Bch., 376-5131. A

Desk & chair, blonde, $40. 632-2003. A

Pups, miniature pinschers, AKC reg., females, 3-mos-old, $75. L.A., 294-6390. A

Boat, 14′ Mark 20 motor & trailer, full canvass cover, spare tires & tubes, life preserver, $200. San Pedro, TE 1-3483. A

Plymouth, 1959, 4-dr. Savoy, auto., $275. Inglewood, 329-0764. A

Cabin Cruiser, 22′, 70-hp Gray marine eng. in-board, fiberglassed, $2000. L.A., 776-4199.

House, 3-bdrm., redec. kitchen, dining room. 50′x120′ lot w/blockwall, $23,950. L.A., 645-6999. A

Volkswagen, 1961, 30,000 miles, sunroof, w/s/w, heater, $1200. Tarzana, 343-7880. A

Piano, Story & Clark spinet, circ. walnut case, $350. Hawthorne, OS 6-5253. A

For Sale

Cemetery Lot, Inglewood Park Rest Haven dble. inter. privilege, perpetual care, $1100. Torrance, DA 6-1471. A

Vehicle, 3-wheel golf cart-type, 4-cycle, B&S eng., 2½ hp, $95. Rolling Hills, FR 5-8536. A

Washer-Dryer comb., Kenmore, $125. Lawndale, 320-2715. A

Dining Room Table, teakwood contemporary, $25. Torrance, 6-5004. A

Storage Cabinet, 1964 5′ bronze metal w/top shelf, $25. Inglewood, 672-6345. A

Volkswagen, 1961, $1200. Eastview, TE 2-5795. A

Stove, Occidental, $20. Hawthorne, OS 9-3540.

Sailboat, sabot, 8′ centerboard w/sails, $120. Torrance, FR 1-5072. A

Monza, 1964 2-dr., 4-spd., r/h, all extras, 1 owner, $1550. Palos Verdes Ests., FR 7-1478. A

Drafting Machine, Bruning, model 2700, used 1 yr., $85. Torrance, 327-8226. A

Chevrolet Impala, 1959, new auto. trans., p/b, p/s, $995. Hawthorne, 676-3132. A

Organ, Lowrey, full scale mahogany, Leslie speaker, $750. Hawthorne, OS 9-5035. A

Posture Chair, moving center sec. & 2 removable end couch, $25. Inglewood, PL 5-4762. A

Cabin Cruiser, 18′ long, 8′ beam, fiberglass & wood, 30 hp Evinrude elect., trailer, access., $500. L.A., PL 4-5288. A

House, 3-bdrm., modern, 2-bath, sundeck, fenced yd., built-in kitchen, $33,000. Manhattan Bch., 379-6442. A

Honda Scrambler, 1963, custom paint & chrome, $650. Portuguese Bend, FR 7-2921.

Honda 50, 1963, helmet, $175. Hawthorne, 675-9227. A

Train, Lionel, many extras, O scale, $75. Inglewood, OS 6-8893. A

Chevrolet, 1956, r/h, 8000 mi. on eng., $395. El Segundo, EA 2-2924. A

Divan, 96″ wide, brown, $40. Rolling Hills, FR 5-6114. A

Plymouth, 1955 sedan, 6-cyl., o/drive, stick shift, 65,000 orig. miles, $175. L.A., PL 4-0078. A

Plymouth Savoy, 1962, V-8 auto., 4-dr., $600. Redondo Bch., FR 5-5760. A

Wanted to Buy

File Cabinet, metal, 4-drwr., letter or legal size in good condition. Los Alamitos, GE 1-4233. B

Camera, 4″x5″ or larger view. Reasonable. San Pedro, TE 1-4525. B

Weightlifting Set, junior size. Harbor City. 326-8033. B

FREE (To Be Given Away)

Dog, toy & manchester. male. 3-yr-old, housebroken, had all shots. Hawthorne. 675-3948. D

Kittens, 9-wks-old, various colors. Torrance. FR 1-2394. D

Records, assorted 45. Manhattan Bch., 372-0816. D

Kittens, 8-wks-old. Rolling Hills, FR 7-3487.

Pups, 2 3-mos-old, half cocker & half poodle, males. Hawthorne, 676-0017. D

Pup, Eng'ish, purebred, 7-mos-old, to good home w/lge. yard. Canoga Pk., 348-4874. D

Rentals Offered

Cabin, Lake Gregory & Crestline, sleep 6, for vacations, weekly, June to Sept., $60 wk., Venice, EX 1-2040. E

Apt., 2-bdrm., garbage disp., laundry rm., 3 miles from Northrop, $90 & $95. L.A., 755-9071. E

Apt., deluxe 2-bdrm, ½ block to Hawthorne Blvd., shopping & bus. $115 mo. Hawthorne, OS 9-1179, OS 6-1774. E

Apt., 2-bdrm, close to Northrop, gar., newly redecorated, fenced yd., $110 mo. Torrance, OS 9-4817. E

Cabin, Lake Arrowhead, sleeps 6, ½ mi. to lake & village, all utilities, $50 wk. No. Hollywood, 761-9645. E

Rentals Offered

Apt., Bass Lake near Yosemite, pvt. ent., deck, dock, & boat mooring, sleeps 4, $100 wk. for 2; $125 for 4. Rolling Hills, 377-2101. E

Apt., near So. Bay shopping center, laundry facilities, thermo heat, 2-bdrm. $115; 3-bdrm. $135. Redondo Bch., 375-6715, FR 6-8801. E

Cabin, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, $30 weekend, $80. wk. Palos Verdes Est., FR 7-3888. E

Apt., 1-bdrm., deluxe, built-ins, pool, $90 mo. Redondo Bch., 376-2117. E

Cabin, near lake, fishing, swimming, boating, $55 wk. Torrance, 320-2002. E

Sleeping Rooms, linen furn., new, $12.50 week. Lawndale, 371-6775. E

Studio Apt., 2-bdrm., unfurn., 1½ bath, tile kitchen, 1 child o.k., near Norair, $115. Hawthorne, 679-0622. E

Bachelor Apt., furn. closed gar., laundry, $95 mo. Torrance, FR 5-0867. E

Apt., deluxe 2-bdrm., 2-bath, dishwasher, fireplace, near Norair, $135. Hawthorne, 679-1358. E

Apt., unfurn., 2-bdrm., $100 mo. Redondo Bch., 376-4978. E

Bachelor Apt., furn., incl. utilities, $50 mo. Hawthorne, OS 6-5021. E

Apt., 1 & 2-bdrm., furn. & unfurn., all elect., $85 & $125. Torrance, 375-9397. E

Apt., 1-bdrm., utilities paid, washer, dryer, pool, 1½ miles from Northrop, unfurn., $100; furn., $120. Hawthorne, OS 9-7123. E

Apt., 2-bdrm., unfurn., children OK, 9 miles from Norair, $90 mo. Lynwood, 635-3784. E

Apt., 1-bdrm., unfurn., garage, serv. porch, yard, $100 mo. L.A., 477-0618. E

Unit, owner's, 1800 sq. ft., 3-bdrm., 3-bath, family rm., fireplace, pvt. deck & 3-car sub. gar. w/storage, soft water sys., adults, $260 lease. Inglewood, 373-1143. E

Child Care Offered

Experienced pre-school teacher desires 3 or 4-yr.-old child to keep in licensed home days. Good educational program as well as play. Hot lunches & snacks. Inglewood, 754-0227. G

Child Care Wanted

Baby Sitting & light housework, part time, own transportation, Baldwin Hills area. Culver City, 838-4378. H

Personals

The deepest thanks from myself & my family are extended to all of the friends of my wife, Marie Tate during her long illness. FRANK E. TATE & FAMILY. L

Wish to thank my many friends for being so thoughtful & for the many cards, gifts, flowers & phone calls during my recent illness. VIOLA PETERS. L

Pilots wanted for flying club, low cost flying in well-maintained, well-equipped planes, 2 Cessna 172's, 2 Beech Bonanza, Meyers 200A, $200 initiation fee & $14 monthly dues. Torrance, 324-2992. L

Apt., to share w/girl, 20-25, 2-bdrms., furn., fireplace, ocean view. Box 1101. L

All Auburn University alumni interested in a get together this fall please contact Dorothy P. McHugh. Inglewood, 673-4369. L

For Sale or Trade

Pontiac Catalina, 1964 conv., auto. trans., p/s, p/b, r/h, b/s, $2750 or trade for older transportation car plus difference. Santa Monica, 393-7464. M

Ford Country Squire, 1964, 9-pass. sta. wagon, fact. a/c, p/s, p/b, r/h, Cruise-amatic 390 X-L, $2795 or trade for older wagon, Santa Susana, 805-526-3902. M

Apt. House, 5-unit, 1-yr-old, 2 blks. from Norair, $81,500 or trade for other property. Hawthorne, OS 6-7417. M

File Cabinet Comb., $25. or trade for record player, banjo or guitar. L.A., AX 4-0727. M

Oldsmobile Dynamic 88, 1960, 2-dr. h/t, p/s, p/b, r/h, auto. trans., orig. owner, $800 or trade for Volkswagen or Triumph in good condition. Sherman Oaks, 784-9776. M

Volkswagen, 1963 2-dr. sedan, r/h, $1375 or trade on van-type camper, Volkswagen or other. Torrance, 371-5229. M

FOUR . . . FIVE . . . SIX . . . SEVEN . . .

. . . AND AN EIGHTH TO ROBERT MCMAHON OF PAGE COMMUNICATIONS (NO PHOTO AVAILABLE).

Norair scholar, Paul Glassco (right), accepts certificate from Welko Gasich. Donald Glassco, father of the winner, is at left.

Northrop Nortronics Treasurer Don Lewis (right) hosted Lance Berteisen, who is flanked above by parents.

From way back east at Nortronics Precision Products Department comes this photo of Mr. and Mrs. David E. Humez and son Nicholas, one of three Nortronics winners.

Nortronics Vice President F. W. Lynch (right) made award at Anaheim to Gary Turnbull, with Mr. and Mrs. Bob Turnbull atttending.

Rice U. Awards Satellite Contract

Northrop Space Laboratories has received a contract from Rice University to design and build a model spacecraft structure for possible future application to NASA's University Small Satellite series.

More than a mockup, the design - model - structure will be a "pre-prototype" of the satellite designed for launch by a Scout vehicle. The structure will be a cylinder approximately 30 inches in diameter and 30 inches long. Completion is scheduled for September 1965.

The prime contract to Rice is from the National Aeronautics and Space Administration at Wallops Island, Virginia. It calls for the university to "design a model structure for a magnetically oriented satellite."

COMPUTER

(Continued from Page 1)

degrees C. It also can be set conveniently on the corner of a desk. It is an all integrated circuit machine.

Two technological areas which provide the economical advantages of the 1051 are the logical organization, contributed by Walt Edwards of Mr. Kaufold's technical staff, and its packaging technique, developed by Mr. Klein.

Loy Spears designed the memory unit and Jack Field was responsible for the circuitry.

With a memory unit capacity of 2000 to 8000 words, the 1051 is sufficient for many of its possible applications, but can be adapted to a more elaborate system by adding memory files, typewriter print-out and other auxiliary equipment.

With the dual organization of the Computer group (project and technology), many other specialists have contributed to development of the 1051 and deserve a great deal of credit, Mr. Klein said.

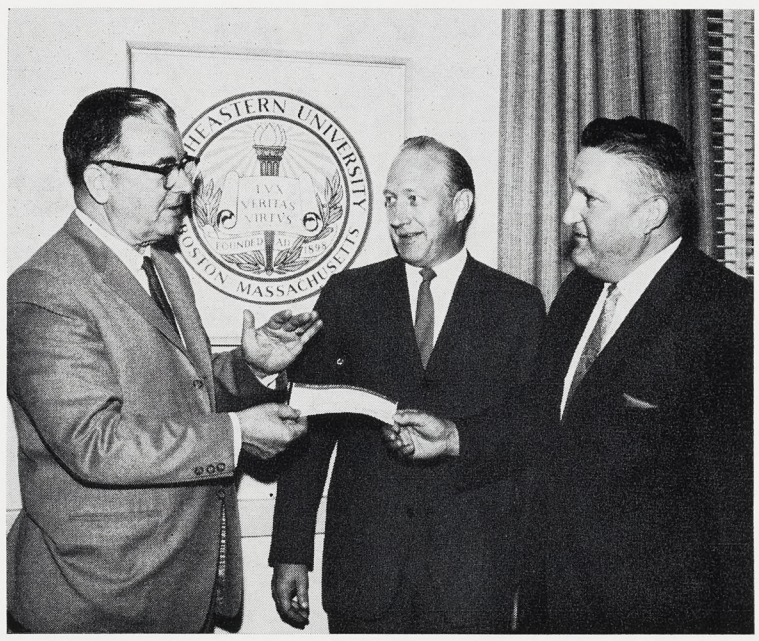
NORTHROP NEWS

Vol. 23 No. 11

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

GIFT TO NORTHEASTERN



Dr. Asa S. Knowles, president of Northeastern University (left), accepts check for its Diamond Anniversary Development Program from Nortronics Precision Products Department in Norwood, Massachusetts. Representing Nortronics are David N. Ferguson, director of factory operations and a liberal arts graduate of Northeastern, and Lester R. Grohe (right), vice president and manager.

GROUP: The Logical World Of Digital Computers

(Continued from Page 1)

first digital differential analyzer. From the 10 cubic foot, MADDIDA began the steady progress toward increasing computer capability while decreasing in size.

In 1951 the computer specialists were part of Northrop's Special Weapon section, supporting development of the Snark missile. They later came up with the APAC, the world's first transistorized missile-borne digital computer.

Prior to APAC, the team had completed two improvements to the Snark system: the Quadratic Arc Computer (QUAC) and the Guidance Function Computer (GFC).

When the transistor era began around 1955, the group followed APAC with the Lightweight Inertial Navigation System (LINS) computer and later the GAM 87-prelaunch computer.

The Skybolt system prelaunch computer was the missile system recently modified for use in an advanced aerial electronic photo mapping system.

The integrated circuit era launched the most recent development in computer technology, which has made possible low cost, high reliability, small size, weight and power.

To describe integrated circuits would require a discussion of many different sciences, such as crystal growing, photo etching or diffusion techniques. But basically it means multiple components in a single package.

The reduction of connections between components also increases reliability.

While transistor circuits cost $100 each—considering two to three dollars per component plus labor for soldering and wiring—integrated circuits cost $15 in small quantities and as little as $5 in large quantities.

Integrated circuits are provided by vendors who specialize in semiconductors.

Nortronics' principal developments in integrated circuit computers have been the NDC 1000, NDC 1002, NDC 1050, NDC 1050A, and NDC 1051. Many of the computers have been used in navigation systems.

With the 1051, Nortronics has extended its capability within the state-of-the-art, according to Eddie Klein, responsible project engineer.

CAMERA CLUB WINS IMPRESSIVE HONORS

The Northrop Camera Club, composed of Norair, NSL and Nortronics members, has chalked up some impressive honors in recent months, NRC Commissioner Les Lauck reports.

In Southern California competition involving 65 clubs, the NRC lensmen placed 18 of 50 slides accepted for final judging. From this the NRC club garnered a second in stereo, third in black and white, and fourth in color slides. Northrop also was awarded the "slide of the year" laurels for this event.

In recent national competition, NRC work placed third in stereo competition.

Page Engineers Designs Advanced Ground Terminal

Page Communications Engineers has announced the development of a new satellite communications ground terminal of advanced design.

The terminal prototype, at the Page test facility on the Chesapeake Bay, is performing tests with the Relay satellite.

Readily transportable by air, land or sea, the Page terminal can be set up and operational on short notice anywhere in the world. The main feature of the terminal is its highly efficient receiving system—usually the limiting factor in satellite communications systems.

The relative simplicity of the system's electrical and electronic equipment and its ease of operation are highly important factors, especially when used in remote locations.

Complete with a fully automatic tracking capability, the Page satellite communications terminal is designed to operate in the civilian satellite communications frequency band. The terminal can be modified however for operation in any of the satellite communications bands.

"A pioneer and world leader in communications systems technology, design, management and operation, Page has greatly advanced the state-of-the-art in satellite communications ground terminals by this latest company-funded R&D program," according to the announcement by Joseph A. Waldschmitt, president of the Northrop subsidiary.

NRC ROUNDUP

NRC Sounding Call For Winter Bowling Leagues

The "big season" is just around the corner for all Northrop bowlers and the call went out this week from NRC commissioners for entries for winter leagues set to open the first week in September. Commissioners Bill Myerson and Vi Jennings of Norair and Dorothy Baldwin and Dick Miller of Nortronics (Hawthorne) have mapped out a schedule to please all bowlers, experienced and novice.

Entries are being accepted from individuals, couples and teams for all scheduled leagues. Leagues begin at 6:15 p.m.

Here is the tentative schedule:

Tropicana Bowl will feature a Monday 750 mixed five handicap loop; a Wednesday men's scratch, approximately 825; and a Thursday (Friday a.m.) 450 mixed handicap trio for swing shifters.

Missile Bowl has plans for an 865 men's classic scratch on Tuesday; a Wednesday mixed five handicap (775); and a Thursday 760 mixed five handicap.

Slated for Del Mar Bowl are a Tuesday mixed scratch (approximately 765); a Thursday (4:30 p.m.) men's trio scratch (485); and a Wednesday 485 handicap men's trio for swing shifters.

At Gardena Bowl a Peterson Point classified mixed four (655) loop will roll Thursdays.

Southwest Bowl will field a 750 mixed five handicap loop on Thursdays.

* * *

BIG TABLE TENNIS TOURNEY UPCOMING

Entries close Friday for an all-Northrop Table Tennis Tournament slated for the last two weekends of July. Entry blanks are now available through Personnel Activities offices or NRC representatives.

This event, to be staged in the Leuzinger High School women's gymnasium, Prairie Avenue and Rosecrans Boulevard, Lawndale, is open to all Northrop people.

Saturday, July 24, singles events for both men and women will be held at 10 a.m. The following Saturday (July 31) at 10 a.m. men's doubles and mixed doubles events will be held.

Champions will be asked to join an all-Northrop traveling team to represent the company in outside competition.

For those who wish to practice, special arrangements have been made with sessions to be held at 7 p.m. July 23 and July 30 at the tournament site.

Specific questions may be referred to Tom White, ext. 2486, Norair.

* * *

GOLFERS GO SOUTH FOR UNIQUE EVENT

Northrop par chasers will take to the road over the coming weekend to play a unique two-part tournament Saturday at Rancho Bernardo Country Club, Escondido, and Sunday at the Pala Mesa Country Club, Fallbrook.

This is a special partner event based on best ball, partner's best ball, low net each day, and overall low net.

Those taking part may compete once or twice.

The Saturday tee time is 8:30 a.m. with an 8 a.m. starting time on Sunday, according to NRC Commissioner Tom Williams.

Entry blanks are currently available through Personnel Activities offices.

* * *

INDOOR EVENT SET FOR NRC MODELERS

"Pilots" of indoor rubber-powered models are being invited to take part in a Norair Modelers meet set for 7 to 10 p.m. July 16 at the Lawndale High School boy's gymnasium, according to NRC Commissioner Earle L'Homme.

All types of indoor models will be flown with no organized competition, although ribbons may be distributed by Jim Richardson, event director, to recognize best flights.

MR. B.: From Gray Matter To Working Hardware

(Continued from Page 1)

research and development efforts.

"If we have a reputation, it is because of our people," Mr. Butler said. "Each employee has many talents and is retained for his or her ability to perform."

Talents almost seem to be a by-product with this group. For instance, a machine shop contains many types of machines and tools. And every employee assigned to that function can operate every machine it contains. This may involve working from drawings or verbal instructions and quite often means carrying a project from its inception to completion.

Equally talented and versatile are the men and women assigned to other basic functions, the Electronics and Precision Assembly areas.

Engineering Development Support personnel are especially adept at fabricating components or systems from scratch, in modifying vendor-supplied items to specifications, in reworking components or in assisting engineers or designers in making "fixes" in already-produced systems.

Because of the developmental nature of work being performed, Engineering Development Support must operate as an integral part of the engineer-design process.

"On the other hand, we are watchful in maintaining the necessary discipline to assure that the work done is codified for use in production programs or future design efforts," Mr. Chalmers points out.

"We cut across many conventional lines and communicate directly on an operating basis with the design engineer," Mr. Chalmers said.

"The end result is a service to all Nortronics that contributes considerably toward our ability to acquire new business."

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 12 | July 28, 1965

Navy Awards Underseas Research Program; Canada Selects F-5 for Ground Support Role

DETAILS PENDING ON PRODUCTION OF 125 AIRCRAFT

The Northrop F-5 has been declared the winner in a lengthy competition for the selection of a new combat airplane for the Canadian Forces.

Official announcement of the Canadian government's intention to purchase 125 F-5s was made at Ottawa July 15 by Minister of Defence Paul Hellyer. The F-5 was selected after a critical evaluation of several tactical fighters.

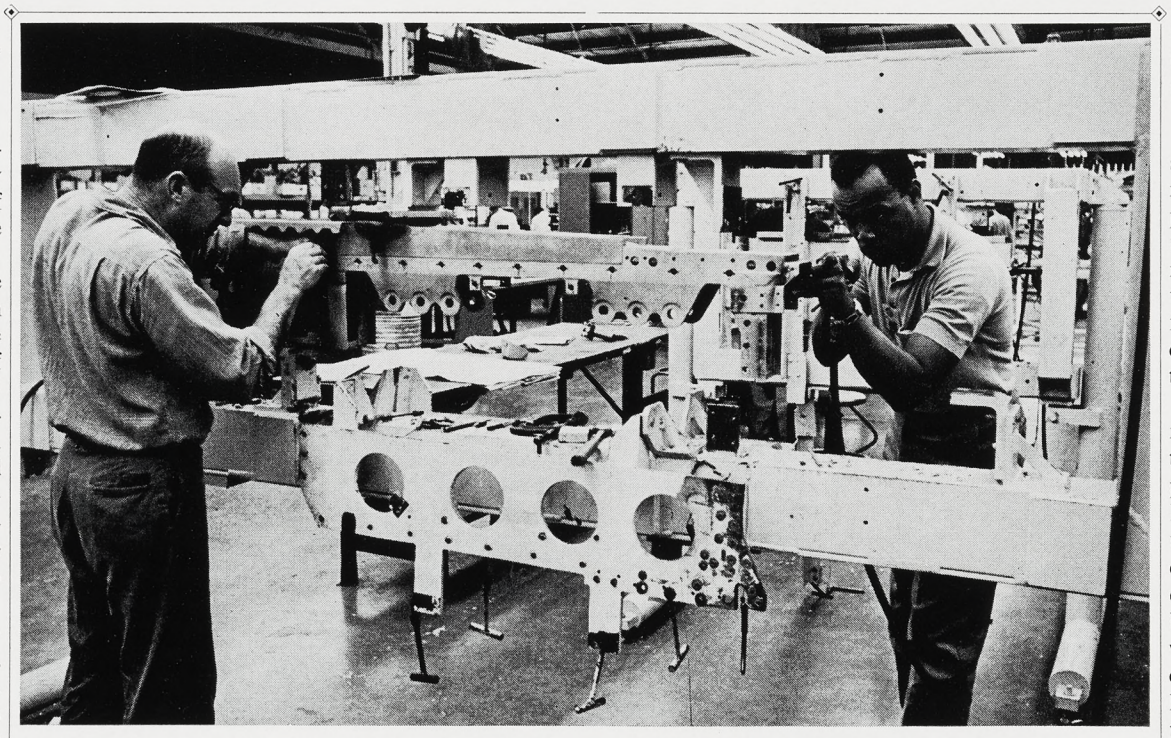
Canada will become the third country to acquire the F-5 by direct purchase, the other two being Norway and Spain, and the ninth country to add the F-5 to its defense inventory.

Squadrons of F-5 aircraft already have been delivered to Iran, Republic of Korea and Greece. The first Greek Squadron was accepted by the Royal Hellenic Air Force on the same day Minister of Defence Hellyer made his historic announcement at Ottawa.

Other countries scheduled to receive the F-5 include the Republic of the Philippines, Republic of China, and Turkey.

The Canadian airplanes will be assembled in Canada by Canadair Ltd., of Montreal, under a licens-

(See CANADA, page 6)



Northrop Nortronics plays important part in Northrop Norair's over-all T-38 trainer and F-5 tactical fighter programs centered at Anaheim. Walter Sanford (right) and Gordon Stinnett perform typical assembly tasks on component above. Other photos of T-38, F-5 production appear on Page 4 of this edition.

FOUR OPERATIONS COVERED IN NEW U.S. PROJECT

Northrop Nortronics has been selected by the Navy as the prime management and engineering support contractor for an extensive underwater research and development program designed to provide new methods and equipment for deep rescue and recovery operations and oceanographic investigation.

Designated as the Deep Submergence Systems Project (DSSP) the five-year, multimillion dollar program is aimed at improving Navy capabilities in four basic undersea operations: speedy recovery of survivors of submarine disasters; creation of deep ocean bases where divers may live and work for weeks at a time; recovery of large ships sunk deep below the surface of the ocean; and the development of a submersible, manned vehicle which can recover aerospace components and conduct oceanographic investigations at a depth of 20,000 feet.

As the systems engineering support contractor, Northrop Nortronics will assist the Navy's Special Projects Office in the management, integration and coordination of all phases of the deep submergence program. This will include establishment of criteria for the design of all systems and the training of personnel and analysis of performance and missions.

Specific objectives of the project are:

—Worldwide recovery of personnel from "bottomed" or otherwise distressed submarines within

(See DEEP SEA, page 6)

SINCE BEGINNING

Nortronics Supports F-5, T-38 Production

Northrop Nortronics personnel are making valuable contributions to both T-38 trainer and F-5 tactical fighter programs.

Since the initial inception of both the T-38 and F-5 programs at Norair, Nortronics has performed a variety of tasks. Work has expanded from initial "overload" requirements to fabrication and assembly.

For instance, in September 1964 Nortronics began profile tasks that include fabrication or detailed work on such items as speed brakes, aluminum forgings, landing gear components, steel forgings and a wide variety of bracketry of various types.

In March 1965 Nortronics stepped up its support efforts to include assembly packages. This effort includes such packages as the aileron assembly, housing assemblies, control stick assembly, control assemblies, engine mounts, rudder pedals, speed brake assembly, etc.

While the number of employees assigned to this effort varies from time to time, some 30 employees, plus supervisors, are normally required at all times.

Elevation of Key Finance Men To Meet Expanding Activity

Three key financial executives of Northrop Corporation have been elevated to positions of new responsibility "to meet the expanding scope of our company's international and domestic activities," Thomas V. Jones, Northrop president and chairman, announced last week.

Irving Roth, Corporate vice president, Finance, has been named to the new Corporate post of vice president and special assistant to the President in charge of international financial and economic policy relationships with agencies of the U. S. Government and of governments of U. S. Allies. Mr. Roth will have policy responsibility for all international negotiations involving sale of Northrop products and services. "With our international business increasing, we determined it would be advantageous to have a Corporate officer of Mr. Roth's stature to conduct international negotiations and otherwise see to it that our business arrangements are handled so as to maximize the financial return to the company," Mr. Jones said. "We must have the greatest sensitivity to our Government's policies on military assistance programs, trade promotion, inter-government credit, balance of payments and our relationship with international financial officials," he added.

Right: Mr. Roth
Below:
Mr. Macdonnell
Mr. Corie

Joseph Corie, who has been Northrop controller since 1959, was appointed Corporate vice president — Government Procurement Policies. This is a new office established to assure "that our company makes the fullest use of the opportunities afforded us to make our own experience available to government policy-making officials and at the same time keep our organization alert to ways in which maximum profit can be assured under new or existing procurement regulations," Mr. Jones stated.

(See FINANCE, page 6)

WINTER KEG PLANS AT CRUCIAL STAGE

Chet Guzinski, NRC bowling commissioner at Nortronics (Anaheim), has reached a crucial stage in plans for winter bowling leagues.

In short, Mr. Guzinski must confirm reservations for loops to begin early in September or cancel all plans for NRC-sponsored bowling this winter.

Present plans call for a Mixed Five's loop on Tuesday and a Men's 810 Scratch league on Thursday, both at Carter Bowl, Fullerton.

Perschy Earns Patent Award

Roy B. Perschy, engineering specialist assigned to the Vigicon information display program at Nortronics (Palos Verdes), has been placed on the Northrop Honor Roll of Inventors.

Mr. Perschy received the Northrop citation and a $50 check for the invention of a low-cost plotting slide for Vigicon projectors.

Northrop CMIP Savings Show Marked Increases

Savings reported in the third quarter under Northrop's Cost and Management Improvement Program, more than doubled the best previous quarter of fiscal 1965, it was announced this month by Ken Hornor, Corporate CMIP administrator.

With $4.39 million logged in the third quarter, the total savings in the current fiscal year reached $8.17 million.

The savings resulted from 480 separate items, bringing the total to 1044 for the first three quarters.

Of the three major cost reduction categories, reduction of operating costs has accounted for the biggest share of savings to date with $4.1 million.

Buying at lowest sound price has accounted for $2.06 million, and buying only what is needed has saved $1.98 million.

"We are extremely pleased with the continuing interest in the program, as evidenced by the fact there have been twice as many items reported in the first three quarter of fiscal '65 as there were in all of fiscal 1964," Mr. Hornor said.

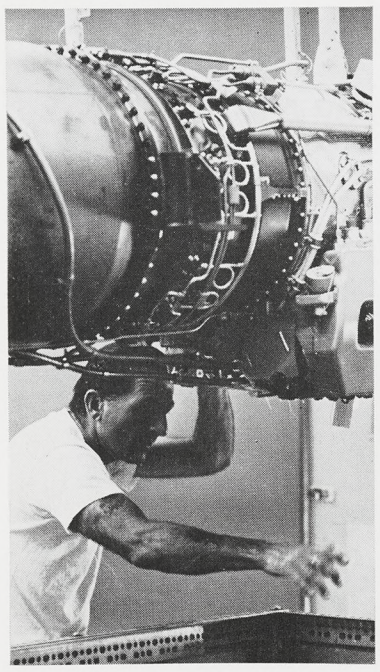
It was also announced this month that Northrop has accepted a recent invitation by NASA to participate in its cost reduction program.

Northrop's third quarter report coincided with Secretary of Defense McNamara's yearend tally of the Defense Department's cost reduction effort, which exceeded the forecast made a year ago.

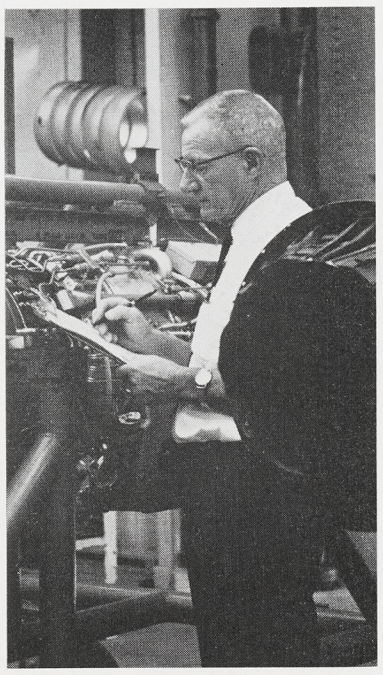
Total DOD savings for fiscal 1965 were $4.6 billion, more than $2 billion over the estimate.

According to Mr. McNamara, the results of the program in three years of operation "have far surpassed our most optimistic expectations. . . ."

One of the most important developments in the program's success has been the understanding and active support of the people in the defense industry who actually perform the work for DOD, Mr. McNamara emphasized.

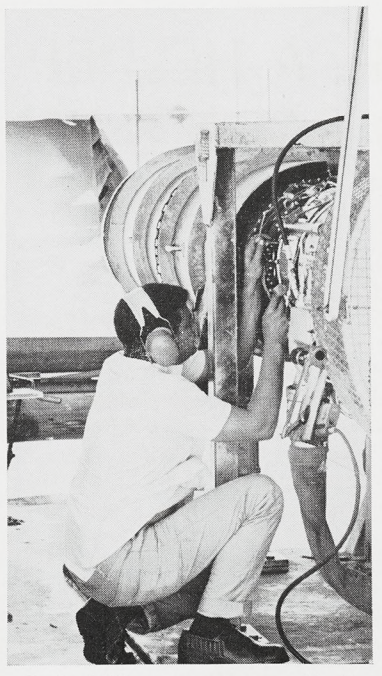


N. R. Williams performs one major Palmdale assignment, buildup of jet engines.

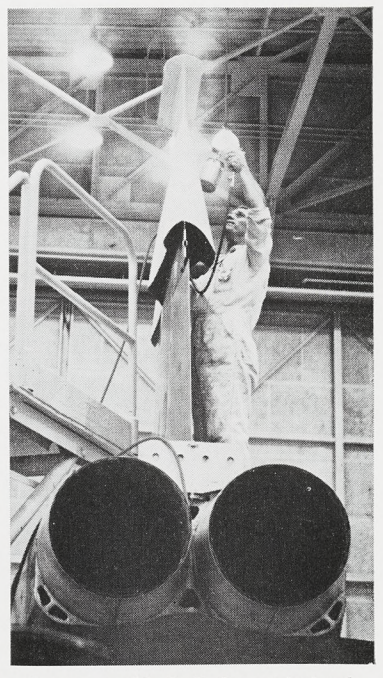


Elmer Blecksmith checks jet engine back in shop after engine run session.

Tom McCracken, Palmdale base administrator since inception, displays model.



B. D. Millican wears ear muffs to deaden roar while making engine adjustments.



Spray gun aids R. D. Casper in touching up tail surface during painting operation.

Palmdale Craftsmen Right in the Middle of Things

Somewhere between those who design and fabricate the T-38 trainers and the F-5 fighters at Hawthorne and the customers who fly them around the world is the Northrop Norair Production Flight facility at Palmdale.

The 270 Norair employees manning that facility like their position—right in the middle of things.

In the true context, Palmdale is an extension of the Norair assembly line at Hawthorne as well as other Northrop divisions and subcontractors who support aircraft programs. It is the point where major components — engines, wings, fuselage, gear, etc.— come together for the first time. It is where the aircraft makes its first flight, goes through corrective actions, then makes subsequent flights until accepted.

Thus, as "middlemen," Palmdale personnel provide the skills to augment and complement all others engaged in aircraft programs.

To better understand Palmdale's over-all impact on the aircraft team effort requires a more detailed look, a quick glimpse beyond the obvious.

First, at Palmdale there are some 400 items actually installed on T-38s and F-5s for the first time. They range from a battery to landing gears, from small components to complete systems. And each system previously installed must be connected during major mating. This requires detailed checks and many adjustments and tests. "Spit and polish" chores like painting and markings are performed as well as detailed buildup and proofing of propulsion systems. Electrical and electronic systems must be verified. Safety checks accompany each step. Preflight operations are detailed and numerous. All of this, and a lot more, precedes the magic moment when jet engines roar to life for the first time and the "bird" functions as a single system. Then, the climax—the first flight.

Ed Minghelli, a Palmdale Flight Operations mechanic, sums it up with: "There is nothing, absolutely nothing, as beautiful as the sight of an airplane, your airplane, making its first test hop."

Since its original inception in 1954, the Palmdale facility has seen many first flights—more than 1700 of them.

This number spans a decade and includes some 1000 Northrop-built F-89 interceptors on their initial flight or first flight following modification; more than 600 T-38s; and over 100 F-5s.

During this remarkable period of operation, Palmdale has never missed a schedule; posted an inviolable accident-free safety record; worked without major damage to aircraft or equipment; and earned many citations for defect-free craftsmanship.

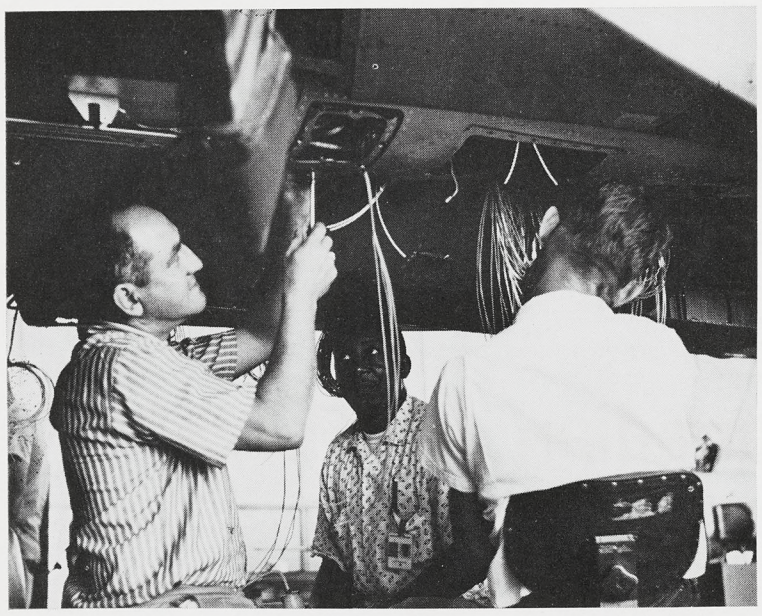
Acceptance flights reflect the over-all end results, since fewer acceptance flights mean resulting savings to the customer and the taxpayer. When the T-38 began an average of 10 or 11 acceptance flights were required. In the initial six months of 1965 more than 33 percent of the T-38s and over 24 percent of the F-5s produced have been accepted on their first flight.

While Palmdale people like to cite this accomplishment, they are quick to point out that it is possible only through the dedication of the Air Force Plant Representative office and skills of all who work on the T-38 and F-5 programs.

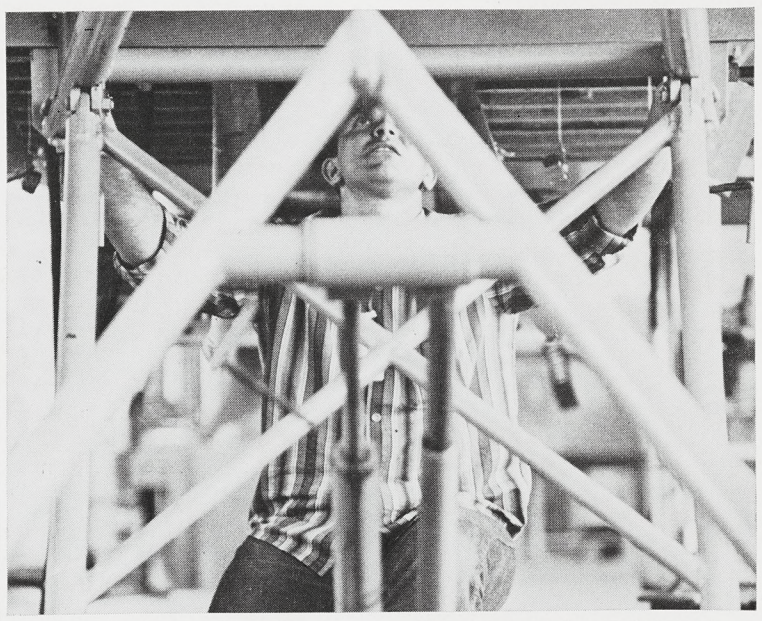
In seeking contributing factors to the success that has become a Palmdale way of life, many ideas are evident. First, the facility is a close-knit, small organization with the shortest possible lines of communication and coordination. It is, above all, a team with every talent required present in its ranks or available on call if needed. A majority of its personnel are long-timers with experience on many programs. Many members of management came up through the ranks and have a strong feeling for the problems of those they lead. There is prompt recognition for ingenuity, ideas and ways of doing a job better at less cost. And most of the employees are close friends and neighbors.

More than anything else, an outsider feels a sense of pride at

(See PALMDALE, page 5)



F. S. Lopez, L. I. Osborne, J. Crawley make one of many electrical checks.



W. A. Lambel gently positions stand under aircraft during mating work.

Fuel truck pumps fuel into waiting T-38 being prepared for flight by George King, P. K. Bolin.

Captain E. E. Hallum, Major R. Sadorf adjust gear with assist from C. E. McGuire, C. D. Wilson.

JOHN CLARK: A HELPER AND FRIEND PASSES ON

A host of Northrop friends and associates were saddened this month by the death of John B. Clark, who died July 19 at the age of 62.

The passing of Mr. Clark prompted this comment from Northrop President and Chairman Thomas V. Jones:

"We at Northrop have suffered a great loss in the passing of John B. Clark. He was a friend whom we will miss in the years to come. I am sure that all of us join in extending to Mrs. Clark and the Clark family our sincere and heartfelt sympathy."

Rosary was recited and a Requiem Mass was celebrated at St. Anastasia's Catholic Church with interment at Holy Cross Cemetery. Mr. Clark is survived by his widow, Peggy, a son and a daughter, John B. Clark, jr. and Mrs. Joseph Hurka.

Mr. Clark

For more than two decades John Clark was a tireless helper and friend to Northrop and Northrop people. He was Northrop Norair director of Industrial Relations for 17 years prior to his retirement last October.

Volumes would be required to cite Mr. Clark's personal accomplishments and contributions to Northrop, to the community, state and nation. He was a man of many causes and many activities.

His humanitarian efforts saw him a member of the President's Committee on Employment of the Physically Handicapped, under the Truman, Eisenhower, Kennedy and Johnson administrations; he was a past chairman of the Governor's Committee on Employment of Physically Handicapped and served with many civic groups working in the fields of crime prevention, children and youth affairs and national affairs.

He served on the Industrial Relations committee of the Aerospace Industries Association, as well as the same committee of the National Association of Manufacturers; he was a long-time member of the Personnel and Industrial Relations Association, the Merchants and Manufacturers Association, and the Hawthorne and Los Angeles Chambers of Commerce.

THREE AFPR OFFICE CIVILIANS EARN SPECIAL RECOGNITION

Special recognition was bestowed on three civilian employees of the Northrop Corporation Air Force Plant Representative (AFPR) office recently.

Lieutenant Colonel Rufus K. Keeling, Northrop AFPR, presented the awards on behalf of the Contract Management Division, Air Force Systems Command.

Receiving 10-year Air Force service certificates were Joshua Treiman, chief of the Industrial Engineering and Support branch; Robert L. Boydston of the Quality Engineering branch of the Quality Assurance division; and Mrs. Bonnie Buckles, secretary to the AFPR.

In addition, Mrs. Buckles received an Air Force Superior Performance Award recognizing sustained superior performance from December 1963 to March 1965. This was Mrs. Buckles' fifth such award in her 10-year career. She has been a member of the Northrop AFPR for approximately four years.

Mr. Boydston has been assigned to the Northrop AFPR for three years, while Mr. Treiman has worked with the same group for approximately two years.

'Plan for Progress' Training Under Way With Northrop Help

Another important step in the "Plan for Progress" program has been taken in the Los Angeles area with Northrop Corporation continuing to play a key part in this national effort.

Currently in session at California State College at Los Angeles is a "Plan for Progress" Vocational Guidance Institute, the first of its kind held on the West Coast. Taking part are 20 public school teachers and 20 minority group specialists from the California State Employment Commission.

The Institute was organized as the result of a request from the Federal Government that William Larrabee, Corporate vice president — Industrial Relations, spearhead industry-wide sponsorship of the program in the Los Angeles area.

The Institute began June 21 and will continue through July 31.

Northrop Corporation, an original signer of the "Plan for Progress" pledge which guarantees equal opportunity for all races, colors and creeds, has participated in making the present Institute possible. Approximately 60 other "Plan for Progress" companies in the Los Angeles area are participating in the program through various methods, including assumption of the cost involved.

Roland B. Scott, executive assistant to Paul Crews, Norair director of Industrial Relations, has represented Northrop in helping to organize the Institute, providing advice concerning the curriculum, and coordinating various activities.

In addition to their classroom work, Institute participants are making weekly field trips to about 60 local firms. These companies have volunteered to assist in the program by showing their operations to the participants, and by full and free discussion of employment opportunities as policies as well as entry requirements for various job classifications in use by the company concerned.

PLAN FOR PROGRESS—Recent visitors at Northrop Norair were participants in a Plan for Progress Institute. Group above (from left) are Roland Scott and John Fink of Norair; William K. Herr, California State Employment Service; Carl Pritchard, California State Employment Service; Leon Mason, John Muir High School; and Richard Stanton, Dodson Junior High School.

Basically, the Institute is attempting to acquaint attendees with existing and projected employment situations; inform them of problems industry faces in seeking qualified minority employees; helping them understand minority students for better communications; making them aware of school programs and practices that can better serve their students; helping them to help students through an increase in student occupational aspiration levels; and helping industry and minority organizations better understand the problems faced by educational leaders in their guidance and training of minority youth.

Warren Prentiss is Kappa Psi Choice

Warren Prentiss, senior engineering writer in Northrop Nortronics' Technical Proposals and Reports unit, has been elected president of the Los Angeles alumni chapter of Alpha Kappa Psi, national business and administration fraternity.

Mr. Prentiss has been active in the alumni chapter since 1947 and has served as publicity director and chapter advisor previously. He invites Northrop employees interested in the group to contact him at ext. 451, Palos Verdes, or at home evenings at 377-6460.

NORTHROP NEWS

Vol. 23 No. 12

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

CANADIAN NEWSMAN WRITES

'Northrop F-5 Is Tops for Canadian Air Force'

By R. J. CHILDERHOSE
Staff Writer
The Telegram
Toronto, Canada
(Reprinted by permission)

Strapping into the rear cockpit of Canada's newest jet fighter was a relief. It is the plane I like, fast, easy to fly, easy to maintain.

If Canada needs a tactical jet fighter, the F-5 is the best of the lot.

The Northrop F-5 fighter is sleek, but not large. It can fly supersonic—to and from the battlefield—carry various loads of bombs, rockets, napalm, yet defend itself with cannon and air-to-air missiles.

The fishback fighter was designed for the Canadian force's role described in Defence Minister Paul Hellyer's White Paper of March 1964. This is the tactical support of Canada's U-N brushfire brigade.

Flying the F-5B (two-seat version of the F-5) was John Januleski, supervisor of Production pilots for Northrop Norair. He is blonde, sunburned. He likes to fly.

Both of us were wearing the fluorescent orange flying suits which help rescuers spot you from the air, a survival measure. The gaudy color abets the true fighter pilot's need to show off.

"She rolls pretty good down the middle of the runway," Mr. Januleski said.

The screamy noise of two General Electric J-85 turbojets beneath and behind threatened his conversation. I turned up the volume and placidly viewed the California sagebrush flitting by.

"Wheels coming up." Clunk tink. Red light in the gear-handle extinguishes itself.

Mr. Januleski is not climbing. We are skimming the runway with full afterburning power on. The airspeed needle marches around the dial, 400 knots by the end of the runway — a premonition assails me.

"400 knots," says Mr. Januleski, and points the needle nose at the sky. It's spectacular. That pilot, needless to say, is a showoff.

Seconds later we make 10,000 feet. The F-5 has been clocked to 40,000 in 3.5 minutes. It's a function of the thrust-to-weight ratio. The F-5 has a 7.2 to 1 ratio of power over weight—considerably better than any other jet fighter today.

"You want to fly it?" Jan asked. "Okay, follow that mountain range. Climb it at

Mr. Childerhose

point nine."

The Mach needle was at .98—just below the speed of sound. Ginger pressure on the roll brought the nose way up on the horizon. The speed dropped to Mach .95.

The green and black mountains he meant were the easternmost range of the Sierra Nevadas, which form the spine of California. Ahead of us lay the snow-capped High Sierras, all brown rock and snow.

"Level her at 45,000. We'll try a speed run."

I finally stopped it climbing at 47,000. "Throw it into A.B.," said Coach Januleski.

Afterburner. I crammed the throttles ahead and felt the lurch of power. The Mach needle marched 0 on 1, passed it and we were supersonic.

July sky, crinkly mountains, dry-beset, snow-splattered Sierras. I began slow rolling. Just sort of balling it up at Mach 1.23 ten miles high. Showing off for the mountain goats.

On the way back—as we were slowing down and descending for a close look at the mountains—John Januleski demonstrated the fast roll capabilities. World and sky whirled.

"380 degrees per second," he said as we snapped out. Less than a second for a complete roll.

We did a 3G loop — nice and easy — and flattened, weightless at the top as John let her drift. High over our heads was the desert. On the wrong side, the mountains.

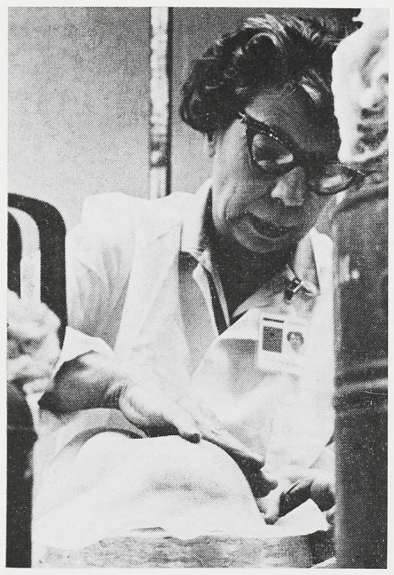
"There's Mount Whitney," said John as we rifled out of the bottom of the loop. "14,000 and something. The highest peak in the U.S."

Ten minutes and 100 miles later we were back at Palmdale.

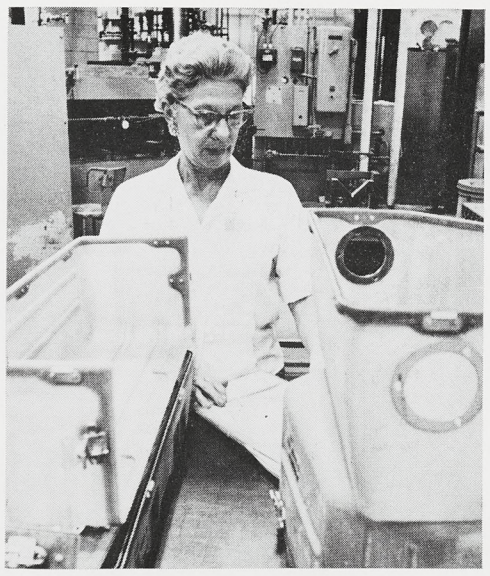
"I'll show you a single-engine landing and go-round," said my pilot.

The significance of landing and then overshooting from the runway on a single engine is that the F-5 can fly away from one of the worst situations a pilot can get himself

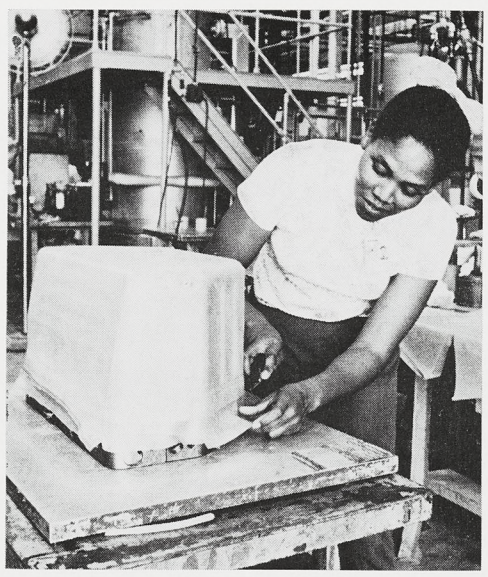
(See CHILDERHOSE, page 5)



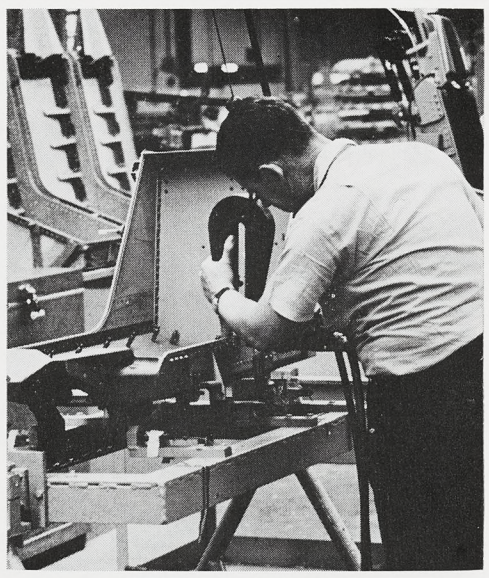
Helen Palenko works on T-38 duct.



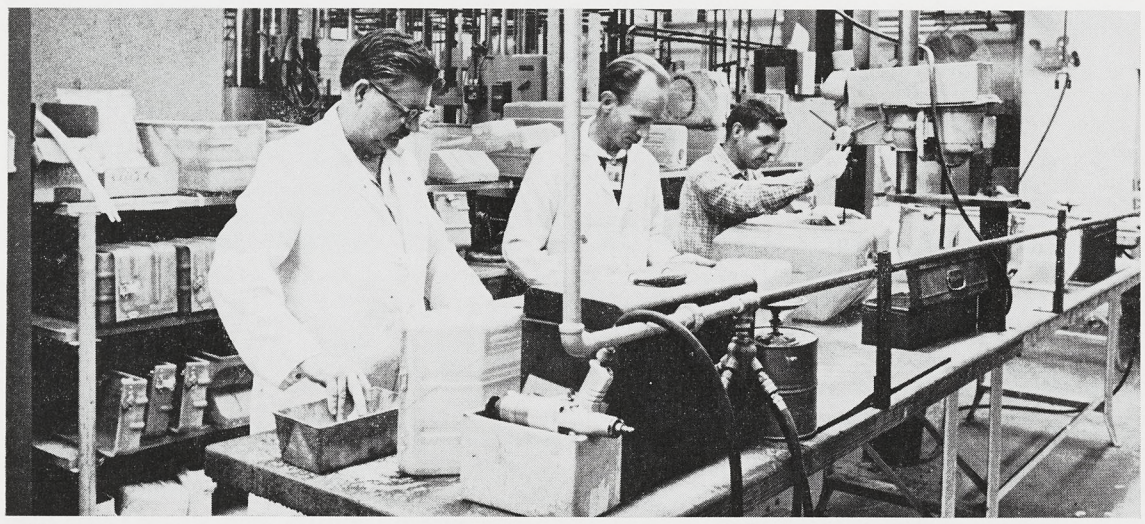
Della Vickers inspects fuel cell assembly.



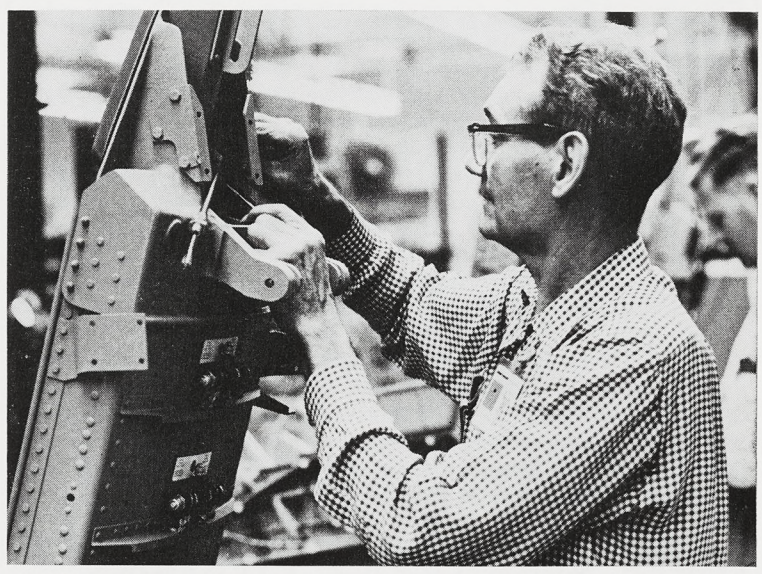
Wilma Whitfield laminates fuel cell section.



Glenn Wescott in early stages of seat assembly.



Willy Dixon, Ken Anderson and Paul Stewart (left to right) turn out plastic fuel cell assemblies at Ventura.



Veteran Northrop Ventura craftsman Mike Reichert puts finishing touch on seat assembly, which will be shipped to Palmdale for installation.

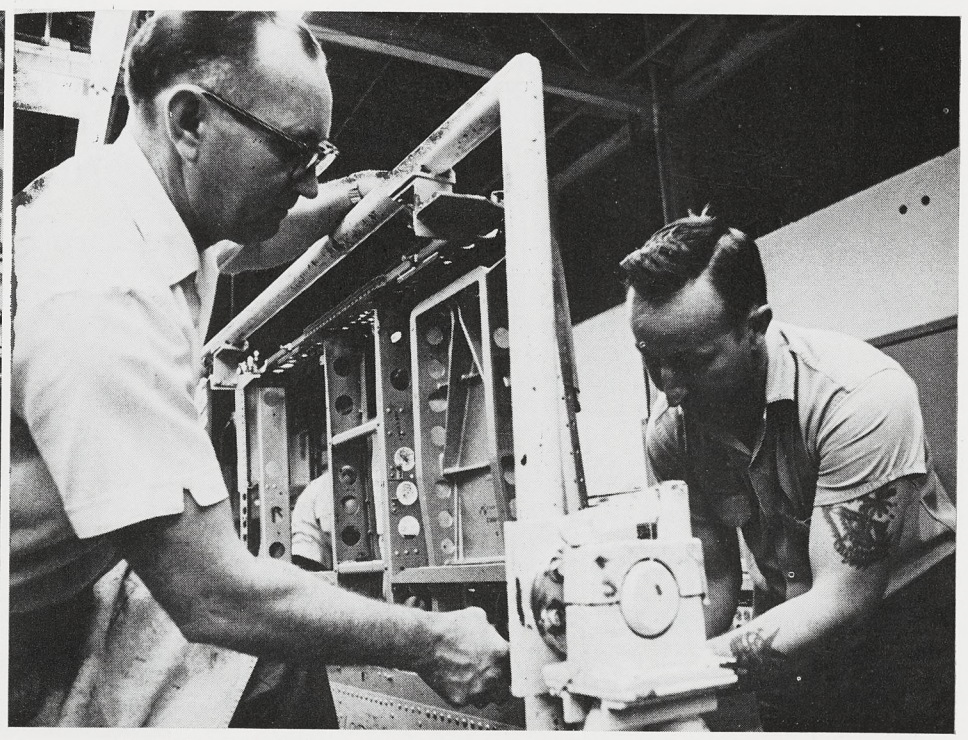
Emmett Evans of Nortronics puts together throttle assembly, one of several items common to both the F-5 and T-38. Mr. Evans is one of more than a score of craftsmen at Anaheim engaged in subcontract work for Northrop Norair.

Northrop pride in T-38, F-5 aircraft is not confined to Norair Division, prime contractor for Air Force trainer and tactical fighter.

Ventura and Nortronics divisions together supply more than 100 components.

Howard Benton (left) and Frank McIntyre contribute to T-38 speed brake fabrication.

James Linn (left) and Paul Harlow assemble F-5 bomb rack at Anaheim.



Nortronics' L. F. Shadowens (left) and Paul Randolf work on T-38 brake assembly.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Drafting Table, 7′, $20. Anaheim, PR 4-3152.

House, 3-bdrm., family rm., Continental appliances, block wall, 1700 sq. ft., near Santa Ana Fashion Square, prof. landscaped, $31,800. Santa Ana, 633-3657. A

Surfboard, 9′4″ Greg Noll w/new skag, $70. Hawthorne, OS 9-4245. A

Stereo, AM-FM stereo, FM multiplex tuner, Bell model 2421, $80. Torrance, FA 8-0460.

Record Player, RCA Victor 45 rpm, stored 10 yrs., $10. L.A., PL 6-3472. A

Organ, Hammond spinet, model M-3, reverberator & sep. speaker, mahogany, $995. Gardena, DA 9-1323. A

Trailer, 15′, sleeps 5, butane stove, oven, 15 gal. water tank, $485. Inglewood, 755-7692. A

Dinette Set, 7-pc., maple, $65. Long Bch., 428-1789. A

Trailer, 15′, sleeps 4, $250. Gardena, DA 4-6843. A

Refrigerator-Freezer, 10 & 12 cu. ft., upright, Marquette, 7-yrs-old, $125. Gardena, DA 4-0649. A

House, newly remodeled, 3-bdrm., 1½ bath, paneled family rm., covered patio, waterfall, o/door lighting, near San Diego & new Marina Fwys., $29,500. Redondo Bch., 398-6658. A

Speaker & Cabinet, University triax, $25. L.A., AX 3-0036. A

Porsche, 1965, 356 S.C. AM-FM, chrome rims, luggage rack, 13,000 miles, new rear Radial tires, $4300. So. Gate, LO 7-9983. A

Vacuum Cleaner, 1959 Kirby, extra attachments, $80. Box 1201. A

Go-Kart, new motor, $45. Inglewood, OS 6-0049. A

Bed Frames, metal, full size, plastic rollers, $10. L.A., GR 3-3168. A

Dining Room Set, 9-pc., 2 leaves, Naugahyde-covered chairs, table opens to 82″, $95. Torrance, 370-4747. A

TV, Zenith 21″ w/stand, $50. P. V. Pen., 377-5724. A

Chord Organ, Magnus w/table, $20. Torrance, DA 6-0340. A

Range, Vista 4-burner, gas, w/Robert Shaw oven, $20. Torrance, 835-3985. A

Bicycle, boy's 20″, butterfly handlebars, Sting-ray seat, $15. L.A., 292-4958. A

Sectional Set, aqua lamps, bathroom sink, $40. Inglewood, OS 6-1475. A

Heater, natural gas, for heating cabins, garages, etc., $10 & $15. Torrance, FA 0-1897.

Bedroom Set, walnut, hdbd, 2 nite stands, 6-dwr. dresser, & men's chest of drwrs., Calif. Guild, $250. Lawndale, 676-3050. A

Corvair Monza, 1961, auto., orig. owner, $650. San Pedro, TE 3-6037. A

Stove, 1963 Gaffers & Sattler, w/middle grill & glass oven door, $85. Inglewood, 672-6345. A

Trailer, 4′x6′ box, new tires, tailites, $50. Inglewood, PL 5-4497. A

House, for immediate removal from property, 3-bdrm, 1¾ bath, 2-car gar., $250. San Pedro, 833-2512. A

Couch, w/2 chairs, $50. Hawthorne, 675-7424.

Table, w/4 upholstered chairs, $150. Tarzana, 343-7880. A

Twin Beds, maple, scalloped headboard, $20. Torrance, DA 6-5004. A

Washer & Dryer, Frigidaire, 1964 Imperial deluxe, used less than 6 mos., $300. Santa Monica, 393-7464. A

Chevrolet, 1959, V-8 Bel Air, 4-dr., r/h, low mileage, $625. Lawndale, 675-8414. A

Range, Sunray, gas, 36″ 4-burner & griddle, 1-yr-old, $100. Hawthorne, 675-9227. A

Woody, 1948 Merc, M.T. mags., good tires, new eng., $200. Hawthorne, OS 6-0264. A

Corvette, 1956 h/top, 3-spd., red w/black interior, $1150. Palos Verdes Ests., 326-7846.

Impala, 1962, f/air, p/s, 327 eng., $1700. Inglewood, OR 7-1792. A

Camera, Keystone, 8 mm w/turret lens, built-in light meter, Kodak projector, $85. Compton, NE 8-5078. A

Ford, 1959, V-8, 2-dr., auto. trans., r/h, $250. Inglewood, 671-0148. A

Buick Special, 1954 conv., needs top, $200. Canoga Pk., 341-3525. A

Chevrolet, 1957 Bel Air, 2-dr. h/top, 301 cu. in. cam & solids, new eng., $995. Lynwood, NE 5-2359. A

Car Cooler, evaporation-type, floor-type; plugs into 12 V sys., $15. Manhattan Bch., FR 2-6916. A

Truck International, 1961, ½-ton, p/s, o/load springs, split rim wheels, new 6-ply tires, 19,000 miles, $1099. Redondo Bch., FR 6-6415. A

Accordion, 120 bass, case, $125. Gardena, DA 4-0158. A

For Sale

Encyclopaedia Britannica, 1965 de luxe edition, incls. bookcase, $275. P. V. Ests., FR 5-5097. A

Chevrolet, panel truck, 1954, r/h, good tires & brakes, $395. Wilmington, TE 4-0362. A

Typewriter, elec., Remington Rand, $35. Inglewood, OR 3-5568. A

Chevrolet, 1958 4-dr. V-8 Bel Air, r/h, w/s/w, low mileage, $475. L.A., 645-8278. A

Trailer, teardrop camping-type, sleeps 2, foam mattress, 48x80, ice box, pump sink, 2-burner but. stove, $500. Inglewood, OS 6-8893. A

Cedar Chest, small size, walnut ext., $25. L.A., 755-6301. A

Corvair, 1960 4-dr., auto. trans., $450. L.A., GL 4-7654. A

Diamond engagement ring, $100. Hawthorne, OS 6-0041. A

Organ, Thomas electronic transistorized, Serenade, ebony, matching bench, 2 keyboards, 25′ pedals, Leslie speaker plus 3 12″ speakers, many extras, $1550. Hawthorne, 679-4365. A

Fiat, 1960 1200 series 4-dr., good tires, $370. Torrance, FR 5-9946. A

Battery Charger, 6V-8V-12V for car or boat, $4.40. Hawthorne, OS 6-0418. A

Home, 2-bdrm, 2 blocks from ocean, knotty pine paneled, cedar closets, unfurn., recently redec., patio & sun deck, 2-car gar., $35,900. Palos Verdes, 377-8259. A

Sofa, 7′ white Naugahyde, $50. Rolling Hills Ests., FR 8-2190. A

House, 4-bdrm, 2 bath, block wall, sprinklers, near schools, freeway, $29,500. Huntington Bch., 714-897-6815. A

Corvair, 1961, r/h, 4-dr, auto. trans., $625. Inglewood, OR 1-6125. A

Organ, Hammond, spinet, M-3 w/percussion, unmarred maple, $890. San Pedro, 831-5837.

Lawnmower, power, 1-yr-old, used very seldom, $50. Manhattan Bch., 379-6762. A

Mobile Home, 1957 Roadmaster, 2-bdrm., 40′x8′, $2300. Hawthorne, 676-5884. A

Piano, upright, white, $75. Torrance, FA 8-3306. A

House, 3-bdrm., 1½ bath, covered flagstone patio w/brick bbq pit, & matching flower beds, redwood fencing, fruit trees, $16,950. Buena Pk., 828-4388. A

Lawnmower, Sears 2.5 hp, rotary, 1-yr-old, $15. Rolling Hills Ests., 325-3057. A

Poodle, miniature, 8-mos-old, male, silver grey, papers & shots, $75. Redondo Bch., FR 8-4891. A

Mercury, 1955, 5000 miles on eng. o/haul, $150. Hawthorne, OS 5-6883. A

Chevrolet, 1962 Bel Air sta. wag., 6-pass., p/s, p/b, auto. trans., r/h, Hi Grade tires, $1600. Hermosa Bch., 831-9033. A

Chevrolet, 1960 Impala, 421 cu. in. eng., 4-spd., Jardine headers, caslers, chrome rev. wheels, many extras, $1500. Inglewood, 674-1847. A

Kayak, 17′, seats 2, incls. 2 double end paddles, flotation tanks, life jackets, $125. L.A., GR 7-7833. A

Diamond Ring, ladies', $50. Redondo Bch., FR 5-0061. A

Baby bottle sterilizer, Evenflo elec., $5. Torrance, 371-8939. A

Chevrolet, 1957 Bel Air, h/top coupe, V-8, auto. trans., p/b, r/h, $550. Torrance, FR 1-5391. A

Mercury, 1958, 2-dr., h/top, full power, r/h, $350. Hawthorne, OS 6-9462. A

VW, 1963, sunroof, pearl white, $1325. Long Bch., 596-1280. A

Ford, 1955, 4-dr. sed., auto. trans., 70,000 orig. miles, r/h, $170. Rolling Hills Ests., 375-6397. A

Plymouth, 1949 4-dr. sedan, new rebuilt eng. & tires, wrecked, $50. Hermosa Bch., FR 9-7342. A

Table saw, 10″, extensions, stand & access., $110. Gardena, DA 3-3202. A

T-Bird, 1955, full power, both tops, many new parts, $1050 or trade for old car & cash. L.A., 645-7591. M

Boat, 1958 Wizard, 35 hp Evinrude, o/hauled, incls. water skiis & access., $250. L.A., 463-0550. A

Ford, 1959, Cust. 300 4-dr. sed., auto. trans., r/h, new brakes, coil, cond., plugs, good tires, $395. Rolling Hills, FR 7-2552. A

Bicycle, girl's 26″, $10. Hawthorne, OS 5-6206. A

Communications Receiver, National HRO-50-T-1, coil set, matching speaker & receiver desk console, w/National select-o-ject, $180. Inglewood, 672-2515. A

House, custom-built, N. Kentwood, 2-bdrm., 1½ baths, paneled den & living rm., forced air heat, fireplace, beam-ceiling, $34,000. Hawthorne, 670-1721. A

Slot Cars, 1/30 scale, many access., $37. P. V. Pen., 377-6193. A

Corvette, 1955, V-8, good tires, orig. paint, $1000. Redondo Bch., FR 5-3521. A

Opel, station wagon, 1959, w/w tires, new battery, plugs & points, $225. Gardena, DA 9-9982. A

Apt. Bldg., 9 unit deluxe, Inglewood loc., 3-bdrm owner's unit, yearly income of $12,540, $107,500. Torrance, 325-9832. A

Cadillac, 1957, full power, $750. Hawthorne, 679-9834. A

Plymouth, Savoy, 1955, 6-cyl., o/drive, stick shift, $150. L.A., PL 4-0078. A

Bicycle, 3-spd., 24″, English racer, $25. Gardena, 324-3410. A

For Sale

Boat, 14′ glass bottom, windshield, steering wheel, padded seats, controls, 25 hp Johnson, small wheel, tilt trailer, $450. Hawthorne, OS 6-5219. A

Hi Fi Amplifier & preamp, stereo, 17 watts per channel, $60. Torrance, DA 6-7996. A

Go-Kart, West Bend eng., diaphragm carburetor, $80. Inglewood, PL 6-7681. A

Football Shoes, size 8, $6. Inglewood, OS 5-5001. A

Table, redwood w/2 benches, $15. Hawthorne, 676-7712. A

Corvette Stingray, 1964, 365 hp, 4-spd. trans., r/h, $3500. Hollywood, 656-3475. A

Chevrolet, 1959 El Camino, 283 eng., stick shift, new tires, hvy. duty shocks, $900. Redondo Bch., 374-2835. A

TV, 23″, maple Packard Bell, $75. Torrance, 370-4444. A

Chevrolet, 1958, 2-dr., V-8, auto. trans., p/s, r/h, new brakes, U-joints, tires, $235. L.A., 645-7591. A

Falcon, 1960, 4-dr. sed., auto. trans., r/h, w/s/w, $485. L.A., 933-1414. A

Refrigerator, International Harvester, 6 cu. ft., cross-top freezer, $65. Rolling Hills, FR 7-1084. A

Sewing Machine, portable, w/Singer buttonhole attach., $25. Garden Gr., 539-2262. A

VW, 1960, radio, w/s/w, $800. Manhattan Bch., FR 9-0032. A

Table, John Alden hardrock maple, w/4 First Mate chairs & hutch, $100. Hawthorne, OS 9-2156. A

Oldsmobile, 1960, 4-dr. Holiday, r/h, air cond., p/s, p/b, $900. L.A., 645-1274. A

Surfboard, 8′x9″, yellow w/redwood stripe, used 4 times, $75. Box 1202. A

Air Conditioner, 18,500 BTU cap., $170. Palos Verdes, 375-6971. A

Range, 30″, G.E., elec., 2½-yrs-old, $50. Playa del Rey, EX 1-7969. A

Wanted to Buy

Swing & slide for small children, will pay up to $12. Compton, 329-9484. B

VW or **Volvo,** 1955-1960, must be in good cond. & priced reasonable. Inglewood, 755-1071. B

FREE (To Be Given Away)

Pup, mixed cocker, female, 10-wks-old. Torrance, DA 5-3724. D

Kittens, 6-wks-old. Whittier, OX 6-6400. D

Kittens, calico, 1-mo-old. Gardena, DA 4-0300.

Rentals Offered

Apt., 2-bdrm., furn., garbage disp., $130 mo. Hawthorne, 679-8711. E

Cabins, Lake Gregory & Crestline, sleeps 6. June-Sept., $60 wk. Venice, EX 1-2040. E

House, 3-bdrm., detached dble. gar., 20 min. from Nortronics Anaheim, $135 mo. Long Bch., 438-5579. E

Vacation Apt., Bass Lake near Yosemite, at water's edge, pvt. entrance, deck, dock & boat mooring, sleeps 4, $100 wk. for 2; $125 wk. for 4. Rolling Hills, 377-2101. E

Apt., 2-bdrm., 2 baths, gar. & storage space, washing fac., water pd., children ok, $130. Inglewood, 672-5798. E

Home, avail. Aug. 1, 3-bdrm., 1½ baths, covered patio & fenced rear yd., sprinklers, $190 mo. P. V. Pen., FR 7-6458. E

Apt., unfurn. 2-bdrm., 2-bath, family rm., air-cond., patio, gar. w/locker, avail. Aug. 15, $145 mo. Buena Pk., TA 8-2857. E

Apt., 1-bdrm., unfurn., pvt. patio, laundry rm., carpet, triplex, 1-level, adults, $78.50. Gardena, DA 9-9195. E

Summer Home, Lake Arrowhead, 2-bdrm., dorm, 2 baths, pvt. beach, sundeck, patio, furn. except linen, $175 wk. L.A., 397-2317.

Apt., 1 & 2 bdrm., all elect., new, 10 mins. from Nortronics PV, furn. & unfurn., $85-$125. Torrance, FR 5-2091, 375-9397. E

Cabin, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, 1 block from golf course, swimming pool & riding stables, $30 weekend; $80 wk. Palos Verdes Ests., FR 7-3888. E

Apt., sound insulation, fenced, playground-equipped yard, extra lge. 2-bdrm., new, walk to Northrop, $115 mo. Hawthorne, OS 5-6032. E

House, 4-bdrm., 2-baths, 2-car gar., lge. patio, block wall fenced, near Nortronics Anaheim, comp. redec., water, trash pd., avail. July 31, $150. Buena Pk., 521-7622.

Studio Apt., 2-bdrm., 2½ baths, deck, subterranean gar., adults, near San Diego Fwy., lease, $175. Inglewood, 373-1143. E

Apt., 2-bdrm., unfurn., priv. patio, $115 mo. Hawthorne, 676-5622. E

Apt., 2-bdrm., washer, play area for children, 10 min. to Norair, $100 mo. Redondo Bch., 376-4978. E

Apt., 3-bdrm., 1¾ bath, in Southwood area, $165. Torrance, FR 1-1308. E

Lost

Cuff Link for French shirt cuff, silver. Los Alamitos, GE 1-5489. J

Personals

Sewing Instructions wanted for approx. 2 months. Your home or mine, will pay. Will furnish transportation if necessary. Inglewood, 674-1730. L

Ironing in my home, 2 blks. from Northrop, $1 hr. Hawthorne, 675-6291. L

Flying Bonanza to Ohio & East Coast Sept. 3-13. Need 2 pass. to share expenses, $130 ea. round trip. Playa del Rey, 397-6326. L

For Sale or Trade

Monza, 1962, r/h, b/s, auto. trans., 102 hp, $995 or trade for late model long bed truck w/or w/out camper. Alhambra, AT 4-5698. M

Ski Boat, 14′ mahogany & fibreglass, trailer & controls, $350 or trade for 14′-16′ fishing boat. Long Bch., 325-2745. M

Cabin, 2 lots in Big Bear Park, water & elec. avail., $3825 or trade on small house, apt. or boat. Manhattan Bch., 372-3878. M

T-Bird, 1955 porthole w/1957 Pontiac eng. & trans., $1350 or trade for VW. Anaheim, JE 4-8982 or Box 1203. M

Ford, Galaxie 500, 406 spec. cam, solid lifters, positraction, new access., tires & clutch, $1500 or trade $1600 equity in Mustang. Inglewood, OR 7-7355. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Imperial & Firestone Blvd., Norwalk. Ernie Romero, ext. 2200, UN 8-1293. 2

7:30 a.m. — 4:15 p.m.

Roscoe Blvd. & Van Nuys, Panorama City. Lynda Witherwax, ext. 2521, 894-3244. 3

Torrance Blvd. & Prospect, Redondo Beach. Karen Krabbe, ext. 1581, FR 2-9711. 3

Highland & Marine, Manhattan Beach. L. Berg, 2763, 379-6762. 3

8 a.m. — 4:45 p.m.

Sunset & Sepulveda, Los Angeles. Jack Donner, ext. 516, 476-1649. 5

Brookhurst & Adams, or Harbor & Adams, Huntington Bch. or Costa Mesa. Gene Dukette, ext. 438, 962-3763. 5

Rides Offered

8 a.m. — 4:45 p.m.

Sunset & Sepulveda, Los Angeles. Jack Donner, ext. 516, 476-1649. 15

Brookhurst & Adams, or Harbor & Adams, Huntington Bch. or Costa Mesa. Gene Dukette, ext. 438, 962-3763. 15

CHILDERHOSE

(Continued from page 3)

into: having to go around for another attempt at a landing on 50 percent power.

This is one of the reasons this writer thinks Canada will do well to buy the F-5.

The fighter has two engines —one of which is enough to get the pilot home. Control systems are duplicated, more insurance against fatal flak damage in combat.

Simplicity in design, ease of maintenance, the ability to operate in the field—off sod if necessary—with no more than fuel and ammo supplied, makes the F-5 a good plane for Canada.

What the proponents of such Cadillac airplanes want is prestige, status and a multitude of airborne roles. The Canadian Government has decreed that we will fill one role: the tactical support of our mobile ground brigade. The F-5 will perform this role well.

Beyond all that, the F-5 meets the final criterion of fighter planes: it has no bad habits. It's easy to fly. It's fast, it's agile. It's a fighter pilot's airplane.

Winter Keg Leagues Still Have Openings

Positions for teams, couples or individuals remain open in most of the planned NRC-sponsored winter bowling leagues for Northrop personnel working in the Hawthorne area.

League action starts the first week in September and this year features a wide variety of leagues to suit all tastes.

PALMDALE: Right in the Middle And That's Where They Like It

(Continued from page 2)

Palmdale. It extends from the janitor to the mechanic, the typist to top management. It is an unbeatable attribute.

Al Graber, superintendent of Manufacturing Operations, feels that this pride, along with good morale, is directly reflected in the products Palmdale handles.

Jack Mannion, Norair manager of Manufacturing and Materiel and "boss" of the Palmdale effort, cites a number of factors influencing Palmdale performance. He speaks of an always-present "can-do" attitude, experience, a desire to excel, and the willingness to meet every challenge head-on.

"Our people at Palmdale perform as a team and work consistently toward cost and quality records," Mr. Mannion noted. "Tom McCracken sets a fine example that is picked up throughout the facility."

Mr. McCracken, base administrator throughout the history of the Palmdale facility, feels dedication and skill are paramount factors. He cites many examples of ways and means developed at Palmdale to better quality and cost. He calls the Palmdale facility one of the best production flight operations anywhere and his people echo their approval of this designation by constantly trying to do better.

"We expect a lot from each other, every person on this team," Mr. McCracken says, "and when we deliver, as we always do, each of us feels a deep sense of satisfaction for a job well done."

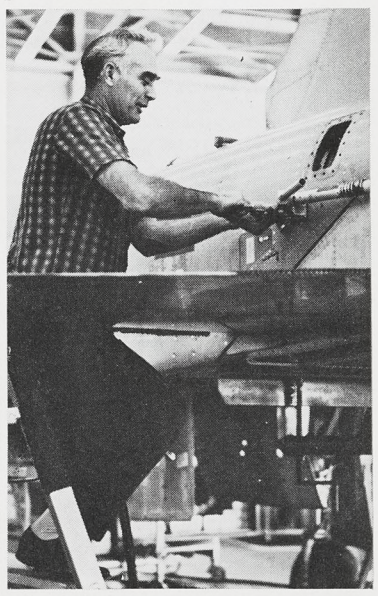
Work on the initial Northrop facility at Palmdale, called Site 2 at Air Force Plant 42, began in mid-1953 and was occupied in early 1954.

The first production airplane arrived at Palmdale in February and first deliveries were made in July of 1954.

Work on the F-89 Scorpion interceptor program phased out in early 1958 and Northrop closed its operations at Palmdale. In early 1960 Northrop returned to quarters at Site 5 for T-38 and subsequently F-5 operations.

Prior to activation of the Palmdale facility, Northrop conducted F-89 production flight operations at Ontario. A majority of the initial Palmdale force shifted from Ontario. In addition, other employees moved there from Hawthorne.

Palmdale offers a variety of advantages for flight testing, including year-around flying weather, uncongested areas, room for expansion, and homes for workers.



Frank O. Large attaches one of many items utilized to check and double-check aircraft.

Ventura Tells How to Land Men on Mars

Data returned by Mariner 4 spacecraft indicates that surface pressure of the Martian atmosphere is within the range used by Northrop Ventura to design a parachute descent system for manned vehicle landings on the planet.

Various Northrop studies on manned Mars missions which have been conducted since 1964 were described by R. N. (Bob) Worth at San Francisco this week before the second annual meeting of the American Institute of Aeronautics and Astronautics.

According to Mr. Worth, a wide variety of Mars atmospheric models were considered, including a 10 millibar surface pressure model developed by NASA.

Mariner data indicates the Mars surface pressure is 10 to 20 millibars or 1 to 2 percent of earth's surface pressure (1013 millibars).

Northrop's proposed descent and landing system includes four major subsystems:

—A drogue parachute of the Hyperflo type to de deployed at a speed of about Mach 2.5 shortly after peak entry deceleration has occurred.

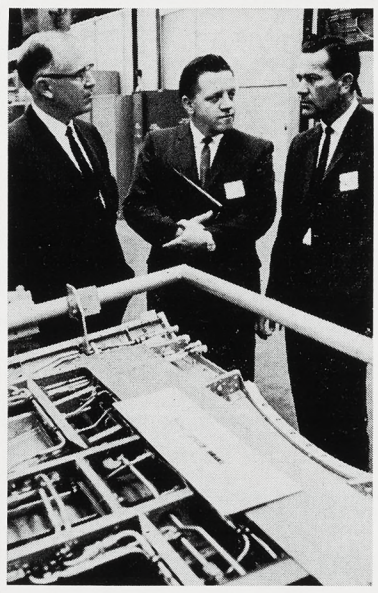
—A main parachute system based on the Northrop Cloverleaf steerable parachute (to be deployed at about Mach 1).

—A sensing and control system to insure proper deployment and sequencing of decelerators and to insure that no super-critical conditions exist during the descent trajectory.

—A terminal deceleration system consisting of a solid fuel rocket engine. A landing leg system absorbs the touchdown velocity and prevents toppling during the craft's final skid.

Northrop Ventura conducted a study on manned Mars landing for NASA's Ames Research Center in 1964 and is continuing its effort.

The studies have been aimed at a system which will provide the spacecraft pilot with sufficient horizontal travel capability, control and descent time that a variety of suitable landing sites may be considered.



OPEN HOUSE

Anaheim and Orange County business, civic and government leaders visited Nortronics July 8 during the Anaheim facility's annual open house. During tour of production area (photo at right), Chuck Hargrove (right) chief of Manufacturing Control, briefs Tom Lacy and Fred Schmuck, treasurer and director respectively of Anaheim Chamber of Commerce, on T-38 speed brake assembly. A product display was also set up (above photo) with briefing conducted by Grant Gunderson (left), chief of Production group, for Joe Geisler, Anaheim city attorney; George Strachan, Chamber of Commerce general manager; Edward Stringer, Anaheim fire chief; and Marie Wilke, Chamber administrative assistant.

FIGHTING FELINES DEFY OUSTER; MILK SOOTHES RUFFLED FEELINGS

Experimental Mechanic Floyd Cayer almost missed his first day of work in nearly 15 years last week after a double shock which "almost scared me to death."

A routine day began with pulling a Hawk missile loader into Floyd's Anaheim workshop for repairs. He was rolling back the loader's canvas cover when a cat leaps out of the engine area with claws bared.

After recovering from that shock, Floyd began tinkering a little further and found three baby kittens nestled in the machinery.

The brunette and two blondes hissed and spat at the experimental group engineers and mechanics until one of the guys went out during coffee break and bought some milk.

The group became so enamoured with the kittens that Dorothy Long, Ralph Homestead and Bob Forshner each took one home.

But the Anaheim security guards tell a story that tops even that one. An employee tried to start his car the other day and was rewarded with that dreaded sound of a dead battery.

He lifted the hood and found a four-foot gopher snake stretched across the spark plugs.

Initial F-5 Squadron Delivered to Greece

A squadron of Northrop-built F-5 tactical fighters has added a supersonic punch to North Atlantic Treaty Organization (NATO) defenses in southeast Europe with their delivery July 15 to the Royal Hellenic Air Force during ceremonies held at Athens, Greece.

King Constantine of Greece headed a contingent of government and military officials at the ceremonies. Northrop Corporation representatives included President and Chairman Thomas V. Jones and Richard E. Horner, senior vice president and general manager of Northrop Norair.

Deployment of the squadron in Greece marked the debut of the F-5 in the NATO command. Two other allies, Iran and the Republic of Korea, have already received their first deliveries of the fighter under the U.S. Military Assistance Program, but are not NATO members.

The versatile F-5 — the only supersonic aircraft in the free world capable of combat operations from unpaved runways—is also scheduled for deployment to Norway, Turkey, Spain, the Republic of China and the Republic of the Philippines.

FINANCE: Three Key Executives Take on New Responsibilities

(Continued from page 1)

J. Grant Macdonnell, who has been treasurer of Northrop's Norair Division since October 1959, was named Corporate vice president and Corporate controller.

Robert M. McNamara, a Northrop veteran, has been promoted to fill the vacancy created by elevation of Mr. Macdonnell to his new office.

Mr. McNamara, who has been manager of Contracts and Pricing, will become Norair Division treasurer and manager of Finance, according to an announcement by Richard E. Horner, senior vice president and Norair general manager.

Announcement of Mr. McNamara's successor is expected this week.

Mr. Roth joined Northrop in 1956 as assistant to the president and was elected vice president in charge of Finance in 1958. Prior to joining Northrop, Mr. Roth held responsible positions in the Department of Labor and the Department of Defense in Washington, D. C. In 1951 he was named chief, Aviation Branch, in the Office of the Secretary of Defense. A recognized authority on aircraft fiscal matters, he represented the U. S. Department of Defense in reconstituting the Japanese aircraft industry and assisted in negotiating the bilateral agreement to build jet military aircraft in Japan. Mr. Roth is a graduate of Southeastern University, Washington, D. C.

Mr. Corie served in the Department of Defense from 1948 to 1956, was assistant director of Budgets in the Office of the Secretary of Defense and was a staff member of the first and second Hoover Commissions. He is a member of the Bar of the Supreme Court of the United States and the U. S. Court of Appeals for the District of Columbia. He has represented Northrop on numerous industry, professional associations and government-industry programs and is an active member and a former chairman of the Procurement and Finance committee of the Aerospace Industries Association.

Mr. Macdonnell has held important roles in the company's financial organizations since he joined Northrop in 1942 as an accounting supervisor. He has been treasurer of the Norair Division since October 1959. Mr. Macdonnell graduated in 1930 from McGill University, Montreal, Canada, and had wide experience in banking and finance before joining Northrop. He had previously been with the First Trust and Savings Bank of Pasadena, California, and prior to that with the National Trust Company of Montreal, Canada.

CANADA

(Continued from page 1)

ing arrangement.

Built to Canadian specifications, the aircraft will be known as the CF-5 and will have more powerful engines and in-flight fueling capability. Details concerning the production program are being worked out by the Canadian and U.S. governments.

"Within the five-year re-equipment program for the Canadian Forces, $215 million has been earmarked for the acquisition of approximately 125 tactical aircraft, as outlined in the White Paper on defence," Minister of Defence Hellyer announced.

In a subsequent press conference, Minister of Defence Hellyer explained that the $215 million program includes more than the cost of the airplanes, stating it "includes the cost of the aircraft and 30 percent for spare parts, engines, ground equipment, royalties, taxes and other charges."

DEEP SEA: Support Contract Awarded

(Continued from page 1)

24 hours of receipt of a disaster signal. This will be accomplished through the development of small, submersible rescue vehicles and improvement of "escape" techniques.

The 12 to 14 man capacity rescue craft will be capable of diving to at least present submarine collapse depths and will be able to rescue personnel from submarines trapped under polar ice caps. Both crew and craft will be air transported to a base near the scene of the disaster and will operate from a specially modified nuclear submarine.

As a secondary mission, these vehicles will be used for general oceanographic purposes which will serve to maintain their readiness to respond dependably in the event of a submarine disaster.

Included in this objective is the improvement of present escape techniques which will enable submarines to safely leave their distressed craft at depths down to 600 feet and rise to the surface without outside assistance.

—Extension of the Navy's current "man-in-the-sea" program which would permit free swimming divers to do useful work on the ocean floor at ever increasing depths for days or weeks at a time. The ultimate aim of the program is to give man the capability of free ranging, completely autonomous existence on the ocean floor to depths of 800 feet and for periods as long as 90 days.

To accomplish this, the deep submergence project will concentrate on improvements ranging from the development of new diving techniques to the creation of large undersea shelters to serve as a base for the divers.

—Deep ocean investigation and recovery of small objects from the ocean floor at depths down to 20,000 feet. The primary system to be developed under this objective will be a manned submersible vehicle which can search for, locate and recover relatively small objects weighing less than 10 tons. Initially a test vehicle will be built that can operate at 6000 feet, followed by four 20,000-foot vehicles expected to be operational in 1970 or 1971.

A primary mission of these vehicles will be the recovery of aerospace components from the Atlantic and Pacific missile test ranges.

—A large object salvage system which would permit investigations into the cause for loss of ships by recovering hulls weighing up to 1000 tons from deep water. The immediate goal is to accomplish such a salvage operation down to a depth of 600 feet, but the possibility of extending the depth much further will be explored.

The primary objective of this system is to improve present large object salvage capabilities which have remained essentially unchanged since 1939. If the hull of a sunken ship is essentially intact, recovery is of economic as well as military importance.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 13 | August 11, 1965

New Process Introduced On TEAMS

A switch to microelectronics in Northrop Nortronics' automatic checkout equipment for a U.S. Navy contract has prompted the introduction of parallel gap welding in joining of integrated circuit packs on printed circuit boards.

The contract, designated TEAMS (For Test Evaluation and Monitoring Systems), was awarded in March by the U.S. Navy Bureau of Ships. The program involves development and production of automatic test and checkout systems for a new class of destroyer escorts.

A complete set of welded boards has been produced and delivered. Transfer of the welding process to operations has commenced with the training of production personnel and initiation of process specification and bulletins.

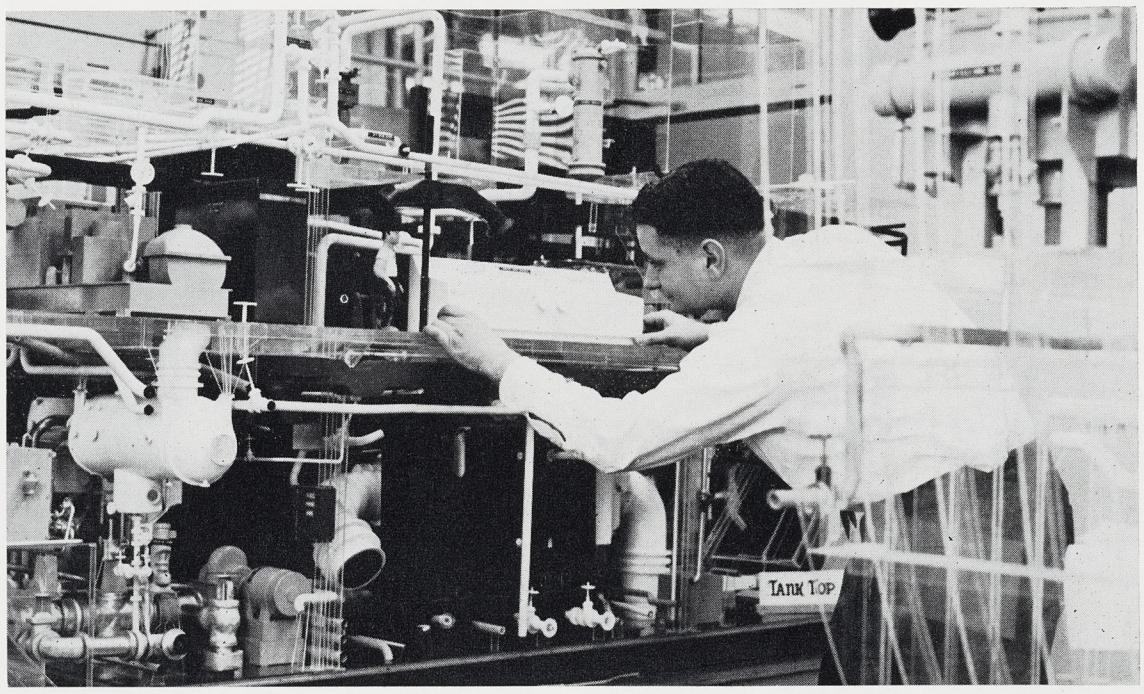
Harry Salinger and Paul Eckroth of Materials and Process Engineering have been the primary forces in recommending and developing the processing concept to Nortronics fabrication. R. R. Lichliter and B. F. Shay, also of Process Engineering, have contributed to the successful application of the new welding process by developing special nickel plating and mounting techniques for the integrated circuit assemblies.

While parallel gap welding is not new to the industry, the recent development of dynamic controls to the welding machines has yielded an order of magnitude improvement to the reliability and to the consistency of welds, Mr. Salinger said.

Materials and Process Engineering successfully innovated a series of changes in printed circuit board processing so as to achieve even higher reliability and welding control. This has resulted in a suitable and effective production tool for Nor-

(See TEAMS, page 6)

PUSHBUTTON SAILING



Scale model of engine room console, a part of ship's automation system under development by Nortronics Marine Equipment Department (MED), is set in place in model of Grace Lines ship which will use system. Martin Goldman of Sun Shipbuilding and Dry Dock Company, Chester, Pennsylvania, is engineer making the installation. MED, located at Needham Heights, Massachusetts, is delivering first hardware soon to Sun Shipbuilding which is under contract to Grace Lines for two of the automated vessels.

HOLE-IN-ONE ON LUCKY 13TH FOR NRC GOLFER

A Nortronics Purchasing supervisor scored a hole-in-one on the 13th green of Inglewood Golf Course this month in Northrop Recreation Club league competition.

Dave Jenkins of the Division's Hawthorne facility was playing with Bob Sadil, also of Nortronics, and Rudy Moller and Harry Scapin of Norair in the Monday night league.

After the 161-yard drive, Mr. Jenkins went on to post an 18-hole score of 74 in topping Mr. Scapin.

"I was so shook up after the hole-in-one," he said, "I three-putted the next hole."

Mr. Jenkins is vice president of the Nortronics Management Club.

Employees Want to Know 'Whys and Wherefores'

The whys and wherefores of company objectives, information on employee benefit programs, and injection of humor were major requests of Northrop employees in a survey of 1300 persons on what they liked and disliked about the NORTHROP NEWS.

Questionnaires, containing six questions on readership habits and 16 story categories for evaluation, were distributed last March at all West Coast facilities of Northrop.

Nearly 1000 replies were received from all levels of employees.

The survey, conducted by an objective source outside the company for the Industrial Relations and Public Relations departments, concluded that: "Over all, the newspaper as it now stands seems to be a huge success with almost all employees . . ."

One of the most common suggestions made for improving the paper was for inclusion of more information on company objectives and the direction in which the company is going.

Work is already in progress to satisfy another major request — for more information on employee benefit programs.

(As for humor, the NEWS is constantly on the lookout for light news and features and invites employees who are interested in contributing cartoons on a continuing basis to submit samples).

A fourth major subject of comment — which depends a great deal on specific suggestions to the NEWS staff by employees — was features on fellow employees.

Completed questionnaires also expressed interest in knowing more about corporate officers who, by the nature of their work, frequently seem remote from divisional activities.

The detailed survey is now being reviewed by members of management, both divisional and corporate.

Campaign Plans Set For Charity

Northrop Corporation's "good citizens" may look forward this week to an opportunity to lend their support to charity and welfare organizations in hundreds of communities where they make their homes.

This opportunity comes next month in the form of the Northrop "Tencennial" AID and NORAID campaign.

This is the once-a-year opportunity for employees to authorize small weekly payroll deductions which go to support these vital community agencies.

And it marks the 10th year Northrop has participated in the AID-United Givers effort.

In nine participating years, Northrop employees have given an average of over $200,000 each year or approximately $24.40 per person. This total is in excess of $2.1 million.

Equally important, is the fact Northrop personnel have also offered helping hands to hundreds of fellow employees in need through NORAID. NORAID is a Northrop welfare program which receives funds from AID to support its operations. Only Northrop families are eligible for NORAID.

Because Northrop personnel reside in widely-scattered areas, they are afforded an opportunity to designate where their AID contributions are to be distributed, normally the community in which they live.

In nine years this has led to Northrop AID contributions going to 154 cities and 16 counties in California as well as 94 cities in 24 other states.

Typically, the forthcoming Northrop "Tencennial" AID and NORAID campaign will include many employees working at many points. Northrop Corporate personnel as well as those at Northrop Norair (Hawthorne, Edwards AFB, Palmdale), Northrop Nortronics (Hawthorne,

(See CHARITY, page 6)

FLOYD CAYER:

Well Tuned Engine Is Music to His Ears

Floyd Cayer reasons nothing quite compares to the sound of a well-tuned engine—be it installed on a slow-moving Hawk loader, a speedy motor boat, the family car or a sleek racer.

This enthusiasm for things mechanical has been with Floyd for almost four decades—from the model "A" Ford to the current crop of Indianapolis racing cars.

Mr. Cayer

Floyd is a laboratory technician in the Engineering Test Equipment organization at Nortronics (Anaheim) where his enthusiasm and skills are used for many purposes, some mechanical.

"I drove a souped up Ford in 1929," Floyd said. "We raced over the dry lake bed that is now Edwards AFB and the mud flats that gave way to the City of Huntington Beach."

In those days a speed of 100 miles per hour was, in Floyd's word, "flying" and purses were made up of the drivers' contributions. Spectators were there only to cheer the dare devils along.

From roadsters Floyd's interest shifted to midget racers and he and Wayne Morrison of Northrop Norair once owned a stable of small racers that appeared up and down California and in neighboring states.

"We raced on weekends and through the week, often hot-footing it to some distant track after work, then driving back in the wee small hours," Floyd said.

Despite these nocturnal wanderings, Floyd is proud that he has never missed a day or been late in 14 years with Northrop.

Along the way Floyd has worked with and known such racing figures as Roger Ward, A. J. Foyt, Allen Heath, Hal Minyard, Chuck Stevens, Bill Cantrell and many others.

In 1963 and 1964 he vacationed at Indianapolis to help

(See CAYER, page 6)

Bloodmobile Makes Palos Verdes Call

The first visit of a Red Cross bloodmobile to Nortronics' Palos Verdes facility attracted 35 donors July 30.

According to George Richards, supervisor of Personnel and coordinator of the drive, the bloodmobile will make annual visits to Palos Verdes.

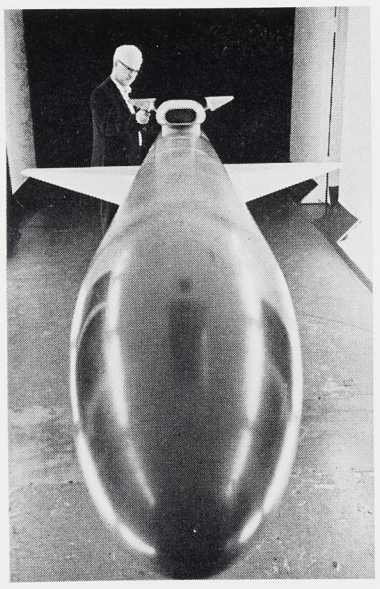
Donations went into the Northrop blood bank, which makes available blood to employees and their families at any time anywhere in the United States without charge. Donors also received individual credit through the American Red Cross.

LIVING COST INDEX RISES; HOURLY PAYCHECKS BIGGER

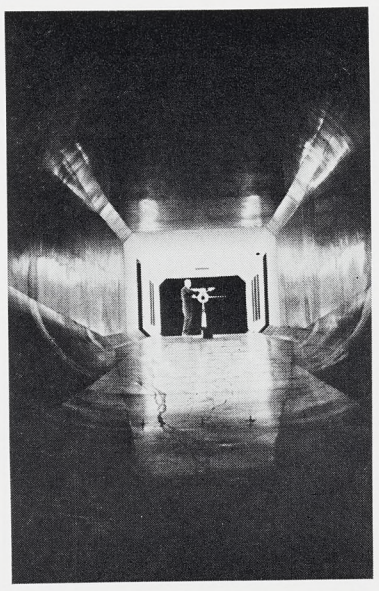
All Northrop Nortronics hourly personnel in California, exclusive of those assigned to Applied Research department, will note pay increases of three cents an hour in paychecks received Friday, this week.

Frederick Stevens, Northrop vice president and Nortronics general manager, announced the increases. They are based on cost of living adjustments following increases in the Bureau of Labor Statistics Consumer Price Index.

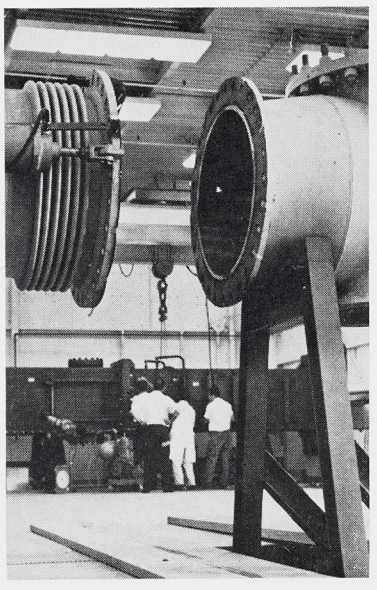
The latest index reading establishes a total cost of living adjustment for hourly employees of eight cents an hour, effective August 2, and including the latest three-cent adjustment.



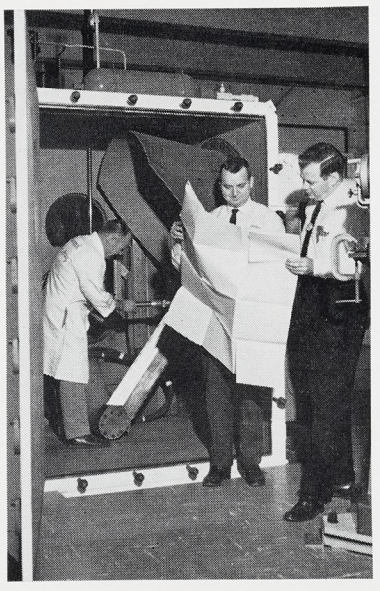
Northrop Ventura's Bob Kinsey, an aerodynamicist, checks NV-105 drone prior to low speed wind tunnel tests.



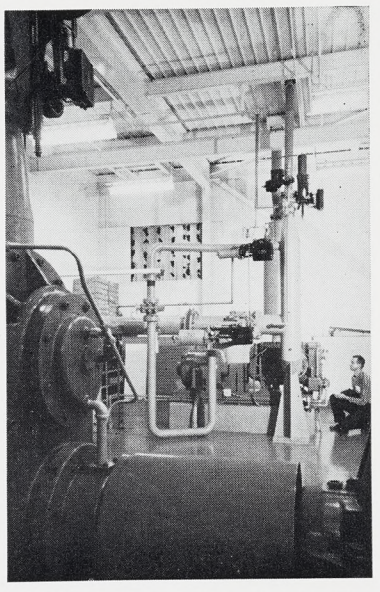
Long wind tunnel seems to belittle size of NV-105 target drone undergoing test program.



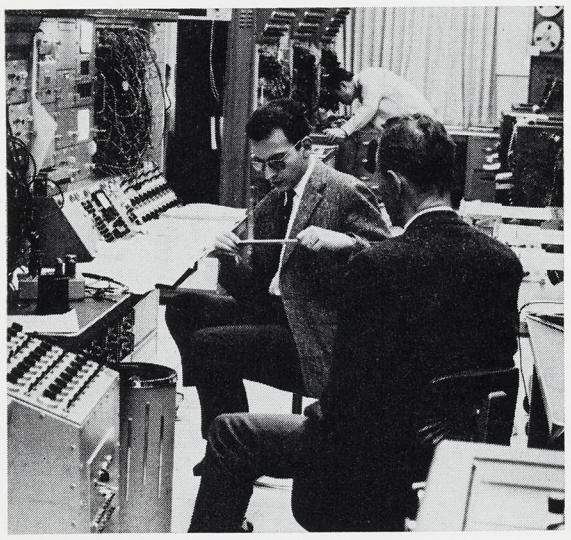
With portion of hypersonic wind tunnel in foreground, Norair crews prep two-foot supersonic unit for tests.



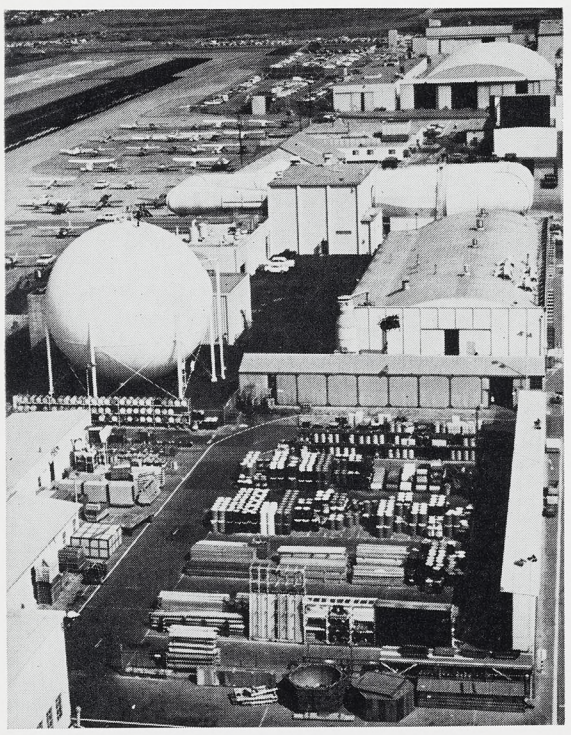
Bob Hobbs, Hank Karaszewski and Walt Watson make last minute checks and adjustments.



Primary and secondary exhaust system for inlet and duct test facility stands ready to perform.



Norair's flight simulator analog computer, another tool in research program, appears complicated above as Al Flores, Hal Kamatani and Bill Taylor work. Below is over-all view of wind tunnel complex with vacuum sphere at left fronting hypersonic and supersonic tunnels.



FROM DROP OF PIN TO MACH 14, WIND TUNNEL SERVES NORTHROP

Experimental aerodynamic studies on advanced aircraft, missile and space systems at velocities ranging from the slightest movement to 14 times the speed of sound (Mach 14) are possible in Northrop Corporation's unique wind tunnel complex.

Located at Norair Division and operated by the Research Laboratories group under Chief Paul Jensen, the complex and its supporting functions afford Northrop capabilities unusual and, in some aspects, unmatched in the aerospace industry.

For instance, the Research Laboratories boast the ability to design, fabricate, test, record and compute data all within a single function.

Manned by a highly flexible and talented group, the wind tunnel complex has gained a reputation for its ability to perform assigned tasks swiftly and economically.

Currently, about 80 percent of the complex activities are in direct support of Northrop programs, with the remainder devoted to outside firms and governmental agencies.

Major facilities with the complex consist of a subsonic wind tunnel and a dual circuit transonic/supersonic-hypersonic wind tunnel. The subsonic unit tests up to about 400 miles per hour. The transonic/supersonic circuit covers a testing range of Mach 0.4 through Mach 5, while the hypersonic circuit ranges from Mach 6 through Mach 14 (14 times the speed of sound).

The transonic/supersonic-hypersonic circuits are powered by the same air supply, 2000 cubic feet in 60 air storage bottles with pressure capabilities of 3200 pounds per square inch.

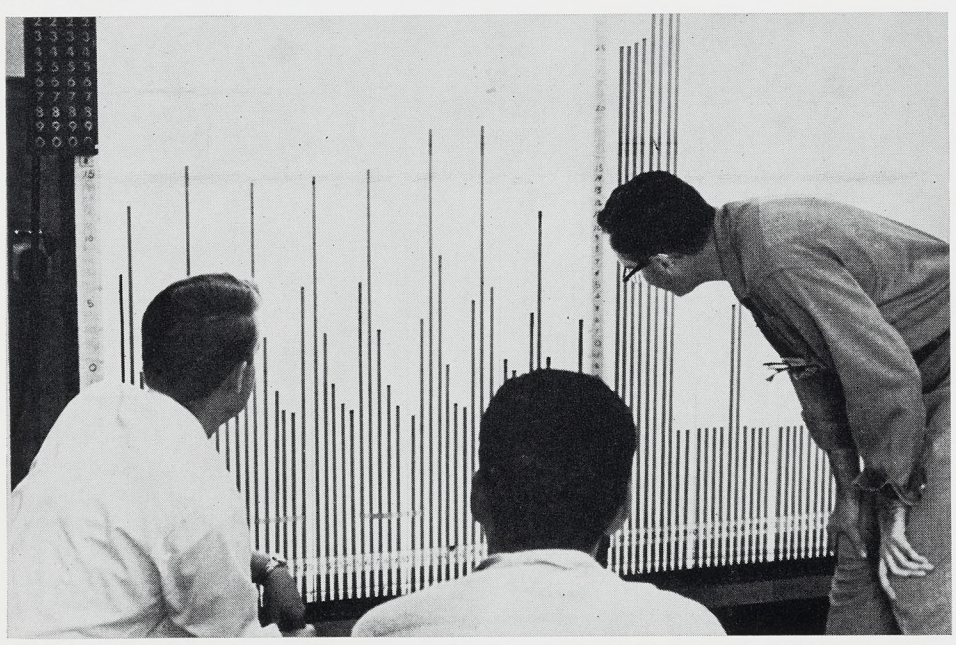
The hypersonic circuit has its own heating and cooling units, plus a giant (100,000 cubic feet) vacuum sphere. The latter, with a 22-foot diameter door, can also be utilized as an altitude chamber (with a 57-foot diameter) in which altitudes of 235,000 feet can be simulated.

Also available in the Research Laboratories are completed design and fabrication capabilities, an Inlet and Duct Test facility, plus a bevy of smaller testing facilities of many types.

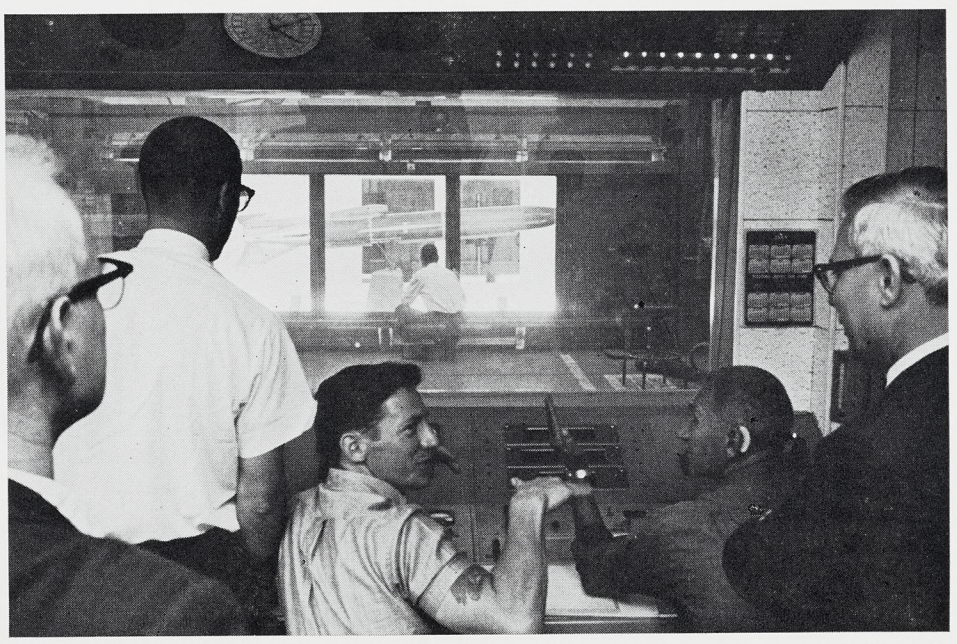
Northrop's original subsonic wind tunnel, with a test area measuring 8 x 11 feet, is also available for conducting tests of up to about 150 miles per hour.

The newer subsonic wind tunnel installation (a 7 x 10 foot unit) has been in constant use since 1956 and has been utilized in the development of the T-38, F-5, X-21A, etc. The present transonic/supersonic-hypersonic facility went into operation in August of 1962.

Key Norair figures in wind tunnel operation include Frank Wiedenhofer, Harry Graves, Hank Karaszewski and Wally Henrich in impromptu confab above. Below Jerry Vinnisch and Joan Martin man posts as high speed data acquisition System records results of wind tunnel test in progress. Information is ready in matter of minutes.



Monometer board gets close attention of Norair trio as tests progress. Northrop's wind tunnel complex also includes wide variety of small, but related test facilities such as inlet-duct testing unit, etc. High speed data acquisition systems make test results available in minutes.



Northrop Ventura 105 drone is spotlighted in subsonic wind tunnel as operators and observers wait for beginning of tests. Norair-based wind tunnel complex supports all Northrop divisions, represents unusual capability. Complex includes subsonic, hypersonic and supersonic abilities.

Ross Heads Palos Verdes School Board

Morwick "Moke" Ross, a member of the Northrop Norair general management staff, was installed last month as president of the Board of Education of the Palos Verdes Unified School District.

Mr. Ross

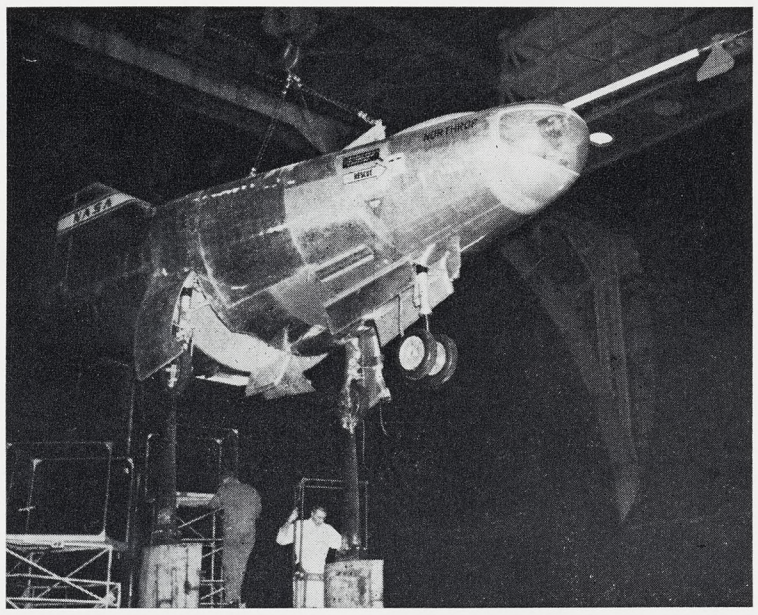
Appointed to the Board of Education in October 1962, Mr. Ross was elected for a full four - year term on the Board by the citizens of that community in April 1965. He was subsequently elected Board president by the members of the Board with installation in July.

A native of Boston and graduate of Northeastern University and former student at the Harvard Graduate School, Mr. Ross joined Northrop Corporation in 1954. Previously, he held executive positions with the Civil Aeronautics Administration. He is a retired U.S. Naval Reserve lieutenant commander.

At Northrop, Mr. Ross has served as an assistant to the Norair vice president for Administration; as assistant to the general manager in charge of the SM-62 Snark program; and as program manager for Manned Aircraft during developmental work on the T-38 and N-156 (F-5). He served for one year in Norair's Washington office and for the past three years has been engaged in new business planning activities.

Mr. Ross and his family are residents of Palos Verdes Estates.

BIG WIND COMING



Technicians at NASA's Ames Research Center make final adjustments in mounting Norair-designed and built M2-F2 lifting body research vehicle in Ames wind tunnel. Following wind tunnel tests, M2-F2 is slated for return to NASA's Flight Research Center, Edwards AFB, for actual flight tests.

YUNT COLLECTS TWICE WITH DRILL CLAMP

A quick action drill press clamp — which may find its way into thousands of homes, as well as industrial workshops — has paid off two ways for Fred Yunt of Norair Manufacturing Research and Development.

He received his first royalty check from a licensing agreement negotiated by the Northrop Product Licensing office represented by Stan Peterson, with Welch Tool Company, and he received a Northrop Patent Award check from Harold L. Fox of the Corporate Patent office.

At the urging of Corporate Licensing Administrator John Oliver, Mr. Yunt displayed the clamp at a recent Product Licensing show sponsored by the Los Angeles Chamber of Commerce.

The item prompted numerous inquiries and as a result, Welch Tool Sales, Inc. was selected to produce and market the clamp under license.

The clamp is easily attached to any type of drill press and, by simply pulling a lever, a craftsman can lock a piece of metal in place while drilling.

In what may turn out to be the second half of a profitable daily double for Mr. Yunt, Corporate Product Licensing is presently negotiating a license on a second invention.

This one is a rotary lathe cutting tool which slices titanium faster than existing lathes and doesn't burn up its blade as those now in use frequently do.

Because of the characteristic hardness of titanium, it is not uncommon for a blade to be rendered useless with only one cutting.

Professional 'Flight' Offered to Secretaries

A one-way "Ticket to Professionalism" is being proffered by Airborne Chapter National Secretaries Association, with an orientation "flight" September 1, at Hawthorne. They will enplane from the Crown Room entrance of the Cockatoo Restaurant, cocktails (5:30-6:30) with dinner in-flight. Destination — success, stability, and self-satisfaction.

Traveling companions will be members of the largest organization of women in one profession in the world. Membership in National Secretaries Association, International, now numbers 25,000 in the United States, Canada, Puerto Rico, and France.

Astrovision will feature a panel of experts who will deliniate the flight pattern and the guide service to be found in National Secretaries Association, on the road to professionalism.

Qualifications: travel light, bring a background of at least two years of secretarial experience, and be actively employed in secretarial work at this time. Accessories: a receptive mind, ambition, loyalty to your chosen field, willingness to broaden educational aims, and a bright smile as your I.D. badge. You might tuck in your boss' blessing. Most executives are acquainted with NSA, and are proud to have their secretary belong.

Ticketing the Airborne Secretaries professionalism flight at Northrop are Marianne Weltman, OS 5-4611, Ext. 1496 and Marge Stevens, CR 4-8061.

International Post Goes to Former AIA Executive

Jack T. Bradley, director of International Service of the Aerospace Industries Association, has been appointed a vice president of Northrop's International Division, Thomas V. Jones, president and chairman announced last week.

Mr. Bradley will make his headquarters at the Northrop Eastern District office in Washington, D.C.

Mr. Bradley has been director of International Service of AIA since his retirement from the United States Air Force with the rank of colonel at the end of 1962. He had a distinguished military career as a fighter pilot and wing commander during World War II and holds many high military honors and decorations, including the Distinguished Service Cross.

In 1955 he was named NATO advisor to the Royal Danish and Norwegian Air Forces. In 1959 he was named chief of the Aircraft and Missiles Division under the Deputy Chief of Staff, Operations, of the U.S. Air Force.

The following year he was assigned to the Far East Division, J-3, of the Joint Chiefs of Staff. In 1961, he was appointed deputy director for Military Assistance Planning in the Office of International Security Affairs of the Department of Defense.

NORTHROP NEWS

Vol. 23 No. 13

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

PIONEERS IN PARADYNAMICS: PART III

They're Looking Over a Three Leaf Clover

In early 1957 the Vince Riley family doctor advised the Northrop Norair structural design engineer that his son's health would improve if he moved to a drier climate.

So the Rileys packed up and moved over the hill to the San Fernando Valley, and Vince launched a new career with another Northrop Division — Ventura.

Vince went on to assist in conception of the steerable, Cloverleaf parachute which Northrop Ventura is presently developing. Vince and Gene Linhart are listed as co-inventors on the patent of this parachute.

The Cloverleaf design, however, was not the result of a split-second inspiration, which characterized so many concepts and discoveries of past eras.

"Inventions just don't come that way anymore," Mr. Riley said.

Three years of concentrated research based on a previous decade's collection of knowledge by Northrop Ventura paradynamicists preceded the present Cloverleaf configuration.

It all started with Ed Ewing's idea of a gliding parachute back in 1961. A modification of the Ringsail (invented by Mr. Ewing), became Northrop's first steerable parachute, and was appropriately dubbed "Glidesail."

An effort was undertaken to demonstrate that a large parachute could be made to glide under controlled conditions. NASA's Manned Spacecraft Center saw the potential of such an approach for manned spacecraft landings, and negotiated a contract to develop the concept further. Twenty-one separate configurations of three-foot diameter models were tested at the Norair wind tunnel. Eventually, the field was narrowed to three configurations for further experiments with 12-foot diameter models which were tested in wind tunnels at NASA's Ames Research Center, Moffet Field, California.

Ultimately, the Glidesail, equipped with flaps for obtaining glide and turn, achieved a glide ratio of 1:1. These tests led to a concept by T. W. Knacke of a single, circular canopy with the center pulled down to form a ridge on top. The concept, under NASA sponsorship, achieved a glide ratio of 1.4:1, and was designated the "Aerosail."

In 1963, the Air Force Flight Dynamic Laboratory at Wright Patterson AFB, awarded a contract to Northrop Ventura which allowed the research to continue.

Carl Graham, manager of the WADC Cloverleaf project, outlined the clear-cut requirements and objectives for a steerable parachute:

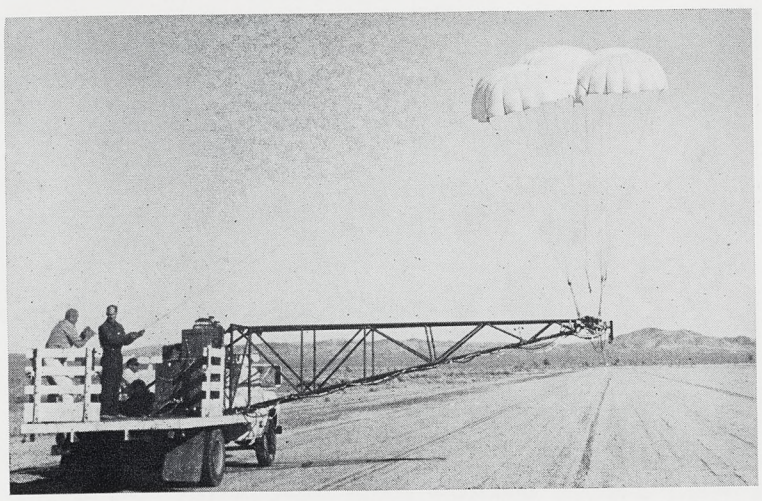
—A high glide ratio to allow the vehicle sufficient ability for horizontal flight during descent in order to reach a suitable landing area. A ratio of two feet of horizontal flight for every foot of descent has been the early goal at Northrop Ventura and has been achieved in wind tunnel and flight tests with the Cloverleaf.

—A high glide recovery to make it possible for the vehicle to steer into the wind.

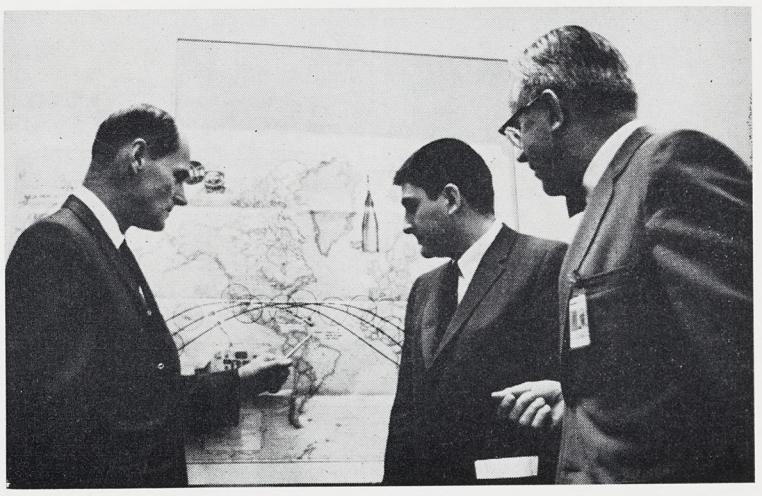
—A fast, logical and simple steering method which preferably would be similar to conventional aircraft.

—Low weight and volume of the total parachute system, an inherent requirement for all deceleration and descent devices.

(See PIONEER, page 5)

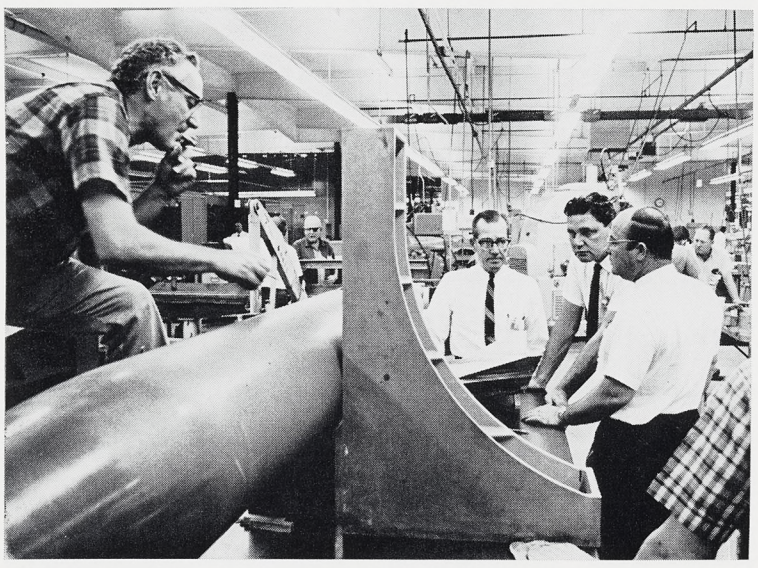


Vehicular tests of Cloverleaf parachute preceded trip to wind tunnel. That's Vince Riley making like Benjamin Franklin.

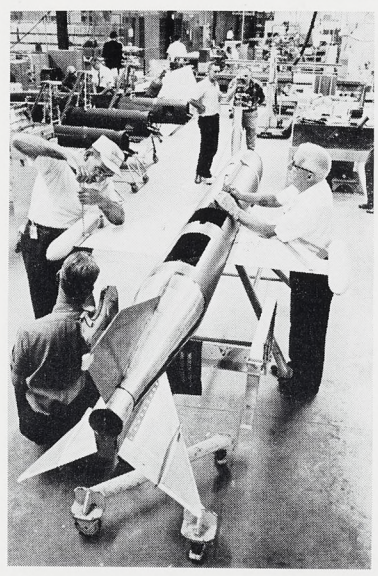


Mr. Riley (left), Gene Linhart, and Theo Knacke (right) study map which plots orbits of U.S. astronauts and a host of possible landing sites in Atlantic Ocean.

NORTHROP VENTURA PRODUCTION GROUP PREPARES ENGINEERING MODELS OF NEW TARGET DRONE



Sam Mannino (left), development mechanic at Northrop Ventura, keeps right on assembling NV-105 target drone while Jack Fisher (center), of engineering task force, and Earl Clark and Bob Bergman of Model Shop discuss design.



Transit is used to assure proper alignment of wind tunnel model which has since been through two-week aerodynamic checkout at Norair.

Wayne Wadington (left), lead aerodynamicist on project, discusses full-scale production strategy with Ralph Friesen, who is Manufacturing program manager for drone projects.-

Monty Cable, research technician, puts together inlet duct assembly, one of primary subjects of wind tunnel tests. NV-105 is slated for flight in October.

ACADEMY SELECTS DR. KELLER

Near Miss Is Still Honor for Nortronics Scientist

While Dr. Donald V. Keller of Northrop Nortronics' new Applied Research section at Newbury Park wasn't named one of the six scientist-astronauts recently announced by NASA, he came closer than 1984 other applicants.

According to Dr. Keller, the original list of 2000 applicants was trimmed to 400 by NASA. The National Academy of Sciences was asked to make nominations from the list of 400 scientists.

Dr. Keller was one of 16 finalists selected by the National Academy of Sciences for the program.

As one of the 16 finalists, he spent two weeks at NASA's Manned Spacecraft Center, Houston, for intensive interviews and medical examinations.

A physicist, Dr. Keller heads a 11-man laser and shock research team (NORTHROP NEWS, May 19, 1965) which recently developed a technique for controlling both frequency and intensity of ruby laser beams.

In a letter to Dr. Donald A. Hicks, vice president and manager of the Applied Research group, the assistant director for flight crew operations at NASA, Donald K. Slayton, said:

"It is our opinion that the fact that he (Dr. Keller) reached the final level of competition and was nominated by the National Academy of Sciences is in itself a considerable honor."

(Deke Slayton himself was selected as one of the original Mercury astronauts, but later was denied a flight in space because of a minor physiological defect.)

Out of curiosity, the NORTHROP NEWS asked Dr. Keller why he wanted to go to the moon.

"It was an unusual opportunity," he said, "combining the features of personal and technical challenges. I think that some of the same characteristics that motivate a man to be a scientist would motivate him to accept the challenges of personally investigating outer space."

Dr. Keller's family was a little hesitant at first about his application but during the long weeks that NASA and the Academy were screening candidates, they got used to the idea.

"Toward the end they became just as anxious as I was," he said.

WINS PATENT

Roy Perschy (left) is inducted into Northrop Honor Roll of Inventors by Northrop Nortronics vice president Ross Miller. Mr. Perschy invented a plotting slide for Vigicon data display system.

F-5 SPANS OCEAN FOR FIRST TIME ON MONTH-LONG EUROPEAN TOUR

Northrop's leased F-5B (N8008) was back on the United States demonstration circuit again this month following an eventful month-long European excursion.

Along the way the F-5B became the first F-5 to carry out an ocean-spanning hop, taking the aerial route over the Atlantic Ocean both to and from Europe. Between these flights the F-5B was viewed by thousands of people at two international air shows, performed solo demonstration flights, and carried out extensive evaluation missions involving European pilots.

John Fritz, Northrop Norair chief of Flight Programs, OPINDOC, piloted the eastward Atlantic crossing, while Casey Finnegan, OPINDOC pilot, flew the westward leg. T. M. Shackelford, a Norair crew member, was observer on both flights.

On both Atlantic crossings the F-5B traveled in company with the famed U.S. Navy Blue Angels.

Stops along the Atlantic route were made at Loring AFB, Maine; Goose AB, Labrador; Sondrestrom AB, Greenland; Keflavik Naval Air Station, Iceland; and Prestwick Airfield, Scotland.

On the European continent the F-5B operated from Evreux-Fauville AB and Le Bourget Airport in France; Gosselies and Brustem, Belgium; and Eidenhoven, The Netherlands.

The F-5B performed demonstration flights at the Paris Air Show and was also placed on static display at the Belgium Air Show.

Murray Makes Plans For Rangers Reunion

Colonel Roy Murray, jr. of the Northrop Ventura Customer Relations staff has been named chairman of the arrangements and programs committee for the biennial reunion of the Ranger Battalions Association in Santa Barbara next month.

The association is comprised of veterans of the six commando units that spearheaded every major invasion during World War II. Colonel Murray, former commander of the Fourth Ranger Battalion, is secretary of the national executive committee.

NEW ASTRONAUT SEES T-38, HL-10

Dr. Edward G. Gibson, a scientist-astronaut-elect, was a special visitor at Northrop Norair last week where he viewed two Northrop products of special interest to his future.

Dr. Gibson, a physicist, is one of six scientists recently selected by National Aeronautics and Space Administration (NASA) for special training as scientist-astronauts (Northrop NEWS, July 14).

One of Dr. Gibson's first assignments in his new career is a 53-week training program at Williams AFB, Arizona, to become a qualified pilot.

DRULINER ASSIGNED TO METROLOGY POST

C. J. Druliner, a veteran of almost 25 years in Northrop Quality Control activities, has been named Nortronics general supervisor of the Metrology branch by Frank W. Lynch, vice president and manager—Operations.

Mr. Druliner will be located at the Anaheim facility and reports to F. W. McNabb, director of Quality Assurance.

Beginning his Northrop career in December 1940, Mr. Druliner has worked in a wide variety of quality activities. He was chief inspector at Northrop Space Laboratories before transferring to Nortronics' Precision Products Department where he has served as superintendent of Acceptance Control for the past 18 months.

Mangurian Moves to MED; Heads Simulator Program

G. N. Mangurian has been assigned as program manager on the world's first Launch Phase Simulator (LPS), presently under development by Nortronics Marine Equipment Department for Goddard Space Flight Center.

The announcement was made by Corporate Vice President and Nortronics General Manager Fred Stevens and Northrop Space Laboratories Vice President and Assistant General Manager Roy Jackson.

As its name indicates, the LPS is designed to simulate launch of booster rockets and its effect on satellite payloads.

The LPS will subject spacecraft simultaneously to varying loads of vibration, acceleration and acoustics. At the same time, air pressure will be decreased to simulate altitude.

According to NASA, which operates the Goddard facility, the LPS will test such spacecraft as space observatory, meteorological, communication, and geophysical satellites.

Mr. Mangurian has been with NSL since 1963, serving first as manager of Applications Engineering and Planning and more recently as manager of Special Projects. He served at Norair as chief, Analytical Engineering and as director of the Engineering Technical section. Mr. Mangurian holds both bachelor and master degrees in civil engineering from MIT.

Visitors to Northrop Architectural Systems "Flying Showcase" leave chartered plane at Fort Worth, Texas, after seeing latest developments in architectural products. Trip covered 18 metropolitan areas, where more than 250 dealers and distributors went aboard.

Flying Showcase Boosts Orders for NAS Products

A "flying showcase" of Northrop Architectural Systems' products has completed visits to 18 eastern and midwestern cities served by the wholly-owned subsidiary's new manufacturing facility at Murphysboro, Illinois.

The sales promotion idea has resulted in a marked increase in orders and a growing interest in NAS products, according to Paul Leslie, director of Sales and Marketing.

More than 250 dealers and distributors went aboard the specially-equipped airplane, which contained displays of Arcadia sliding glass doors, storefronts, window walls, and other Arcadia products.

Production got under way in May at Murphysboro in a move toward a larger share of the architectural building products market in the east and midwest.

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills.

Classified

Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Bicycle, boy's 26", $10. Inglewood, PL 6-7681. A

Datsun Fairlady, 1965, r/h, new tires, $1650. Torrance, DA 6-7480. A

Rambler American, 1959, 2-dr., r/h, auto. trans., $325. Lawndale, 371-9861. A

Tools, Starrett, small hole gages, 1" micrometer, 2" micrometer, depth gages, calipers, sell sep. or $45. Inglewood, OS 6-0049. A

Aquarium, 10 gal. w/stand, pump, heater, $10. P.V. Pen., 377-5724. A

Headboard, $3.95. Gardena, 329-9486. A

Range, Kenmore, about 8-yrs.-old, $15. Manhattan Bch., 379-6762. A

Encyclopaedia Americana, 1963 edition, incl. 2-vol. set Funk & Wagnall's dictionary, $200. Hawthorne, 676-5884. A

O'Keefe & Merritt Comb., 1965 model, to be built in, $250. Lawndale, 676-3050. A

Stove, dble. oven, Estate, $10. Torrance, DA 6-5004. A

Austin Healey, 1956, 4-cyl., $500. Inglewood, 672-5798. A

Lot, large, in Palos Verdes Estates, terms, $20,500. P.V. Ests., FR 5-0867. A

Chevrolet, 1958, new tires, RCA record player, $700. Hawthorne, OS 6-0264. A

Boat, 20' Owens w/75 hp Evinrude, twin 20-gal. fuel tanks, sleeps 4, $2300. P.V., 377-8259. A

Dinette Set, chrome finish, 4 chairs & table $40. Manhattan Bch., FR 2-6916. A

Engagement & Wedding Ring Set, ⅛-k centercut, 10 smaller diamonds, $150. So. Gate, LO 7-9983. A

Ski Boat, 16' Glastron, 70 hp Mercury eng., used less than 10 hrs, elec. start., Walstrom trailer, $1550. Long Bch., 244-5987. A

Drafting Machine, K & E Paragon w/24" arm, $50. Anaheim, PR 4-3152. A

Golf Clubs, glass-shaft, D-4 wt., 8 irons, 1 pitching wedge, 1 putter, 3 woods, bag & cart, $125. Gardena, DA 3-3202. A

Outboard Motor, 40 hp Mercury, elec. starter, 6-gal. gas tank, $265. Hawthorne, OS 6-5219.

Fire Alarm Sys., 8 units, Emdeco, $50. Garden Gr., 714-539-2262. A

Volkswagen, 1963, sun roof, radio, w/s/w, $1250. Hollywood, 656-3475. A

Wedding Dress w/veil, silk organza, size 10, $80. Inglewood, 672-5903. A

Tires, 2, Goodrich tubeless w/s, 7.50 x 14, $20. Hawthorne, OS 9-4387. A

Kitten, Siamese, 7-wks.-old, female, frost-point, $20. Buena Pk., 714-521-0416. A

Schnauzer, min., male, 9-mos.-old, AKC reg., $100. Anaheim, 714-776-8956. A

Saxophone, alto, gold finish, Buescher, new pads, $150. Santa Monica, GL 4-7770. A

Trailer, 1964 Lo Liner, 13½', complete w/8' x 8' enc. canopy, used less than 5000 miles, $1050. Lakewood, HA 5-6844. A

Apt., 4 units, in San Pedro, P.V. area, $45,000. Inglewood, OR 7-8797. A

T-Bird, 1962, r/h, w/s/w, full power, $2200. Inglewood, 677-0743. A

Camping Equipment, 3-burner, Coleman stove, 2-mantle lantern, ice chest, $35. Los Alamitos, GE 1-4233. A

De Soto, 1957, Firedome 2-dr. h/top, full power, $225. Hermosa Bch., 376-5131. A

Buick, 1954, Special conv., $250. Canoga Pk., 341-3525. A

Cooler, room-size evaporative-type, used once, $62.50. P.V. Pen., 377-3806. A

House, 3-bdrm., 2 baths, built-ins, fireplace, pvt. patio, dble. gar., near schools, & beaches, $32,500. Torrance, FR 8-1350. A

Typewriter, Remington Rand, portable w/ case. 15-yrs.-old, $35. Redondo Bch., 378-3981. A

Chevrolet station wagon, 1960, Parkwood, V-8 eng., p/s, $895. Inglewood, OR 4-6096.

Sailboat, 14' Omega calss, fiberglass w/ mahogany trim, w/custom trailer & all equip., $800. Redondo, 379-7567. A

GTO, 1965, h/top, 4-spd., 9000 miles, $2850. Playa del Rey, EX 1-8072. A

Window, 4, 3' x 5' louvered, alum., $40. Manhattan Bch., 376-4787. A

Tape Recorder, new tape speed of 15/16, plus 1⅞, portable, battery or AC operated, auto & AC adaptors, other access., $87.50. Box 1301. A

Volkswagen, 1963, headrest, s/b, $1250. Hermosa Bch., 379-8832. A

House, 4-bdrm., 2-bath, large fenced backyard, $450 down, $17,550. Gardena, DA 9-6297. A

Austin Healey, Sprite, 1959, r/h, $600. Lawndale, 370-6472. A

Movie Camera, K56-Keystone 16mm, mag. load, 1.9 lens & 75mm 3 in. tele. lens, K-161 16mm Keystone projector, $199. Thousand Oaks, 805-495-3449. A

Surfboard, Jacobs, 8'11", or 1' redwood stringer, $70. Inglewood, OR 0-3713. A

Television Set, Packard Bell, 21", maple cabinet, $65. Torrance, DA 9-3721. A

House, 3-bdrm., 1¾ bath, 1750 sq. ft. w/ patio, 2-car attached gar., fireplace, fully landscaped, fenced yd., near schools & Harbor & Santa Monica Fwys., $2000 dn., $26,500. Torrance, TE 4-9420. A

Stereo, custom-made, 8' long, black walnut, 2-12" Stevens full-range speakers, AM-FM & MX. 70-watt EICO int. amp. & Gerrard type A changer, $600. Gardena, 327-2727. A

For Sale

Glass boat, 1930 model, 12' w/7½ hp motor, on trailer, $350. Hawthorne, OS 5-3866. A

Cadillac, 1958, sedan De Ville, $750. Hawthorne, 676-8738. A

Shaver, elec., Schick 10-66, 3-spds., adjustable heads, $8. Torrance, 371-9651. A

Mini-Bike, big frame, 5½ h.p., West Bend, $140. Santa Monica, 391-1471. A

Trailer, Fleetwood, 1957, 2-yrs.-old, my equity of $2000 & take over pymts., bal. approx. $3600. Gardena, 329-7998. A

Air Conditioner, fits 1964 Falcon V-8, never installed, $150. Inglewood, OR 2-2370. A

VW sedan, 1960, new paint, radio, rear speaker, w/s/w, $850. L.A., 755-4396. A

Furniture, Early American, living, dining, bed rooms & kitchen, sell sep. or $1000. P.V. Ests., FR 5-8625. A

Boat, Glasspar Delmar, American tilt trailer, complete, $1295. Gardena, 635-3127. A

Range, $10. Hawthorne, 675-9389. A

Kittens, Siamese, seals & blues, $25 w/ pedigree, $20 w/out papers. Hawthorne, OS 5-9789. A

Chevrolet, Biscayne, 1959, 47,000 miles, 1-owner, $425. Hollydale, ME 3-2395. A

Volkswagen, 1963, sunroof, $1250. Long Bch., 596-1280. A

Hillman Husky, 1962, 17,390 act. miles, $550. Anaheim, KE 2-3103. A

Executive Home, 2400 sq. ft., heated pool, view lot, $45,000. Thousand Oaks, 495-9984.

House, 2-bdrm., lge. living room, h/wood floors, fenced yd., $20,500. Redondo, FR 8-2609. A

Trailer, 4' x 6' box, new tires, $50. Inglewood, PL 5-4497. A

Range, O'Keefe & Merritt, 4-top burners, grill, broiler & oven, auto. timer, $65. Gardena, 675-1005. A

T-Bird, 1955, h/top, full power, many new access., $975. L.A., 645-7591. A

Executive Desk, w/swivel chair & side chair, $60. Torrance, DA 9-2403. A

Porsche 1600 super coupe, 1957, Bursch exhaust, Koni shocks, h/rest, $1350. Redondo Bch., FR 5-6773. A

Falcon, 1961, 4-dr., deluxe wagon, luggage rack, $875. La Mirada, 714-LA 1-9965. A

MG-TF, 1955 Classic, low act. miles, wire wheels, new top, $675. Manhattan Bch., FR 2-0540. A

Chevrolet, 1957, 210 stick, V-8, r/h, new tires, $399. Long Bch., 596-2039. A

Player Piano, elec., rolls & cabinet incl., Muzette, $900. Inglewood. OS 6-1070. A

Massage, Niagara, Cyclo, heat & massage pad, complete, carrying case, $200. Lakewood, 425-1638. A

Baby Bottle sterilizer, Evenflo elec., $5. Torrance, 371-8939. A

Chair, blue, contemporary, $45. Rolling Hills Ests., FR 8-2190. A

Fiat, 1960, 1200 series, good tires, $300. Torrance, FR 5-9946. A

Volvo, 1961, racing cam, tach., 4-spd., r/h, b/s, $795. Anaheim, KE 5-6296. A

Mustang, 1965, stick shift, r/h, 12,500 miles, 1 owner, $2050. Hawthorne, OS 6-2597. A

Monza, 2-dr., 4-spd., 1964, r/h, all extras, b/s, 1 owner, $1475. P.V. Ests., FR 7-1478.

Chevrolet Impala SS, 1964, p/b, p/s, r/h, fac. air cond., $2950. Ontario, 714-984-4660.

Ski Boat, 15'8", Classic (trophy model), 1964, 85 hp Mercury outbd., mech. steering, many extras, $1695. La Mirada, 714-521-9798. A

Buick Special, 1962, V-6, beige, $1200. Hawthorne, 677-4271. A

End Table, set, Heritage contemporary, $60. L.A., FR 8-2190. A

Bedroom Set, 5-pc., maple, $75. 754-4384. A

Wanted to Buy

Boat, 12' or 14' alum., with or w/out motor. San Pedro, 831-5304. B

Chevrolet, late model or GMC station wagon on truck chassis. Hawthorne, OS 6-8331. B

Table, redwood, 6', pay up to $10. Torrance, FA 8-3306. B

Camera, single lens reflex 35mm, desire built-in meter. Torrance, FA 8-0460. B

Motor, 4-cyl. or equivalent for 1960 Singer Gazelle or Hillman. Inglewood, OR 7-7355. B

Rentals Offered

Apt., 2-bdrm., 1½ bath, unfurn., lge. closets, child OK, 2 blocks to Norair, $115 mo. Hawthorne, 679-0622. E

House, 2-bdrm., avail. about Sept. 4, water pd., $125 mo. Hawthorne, OS 5-6206. E

Duplex, 3-bdrm., on the beach, garage, patio, $160 mo. Hawthorne, 679-5506. E

Apt., single & 1-bdrm., redecorated, furn., utilities pd., pool & rec. fac., from $92.50. Torrance, 329-9276. E

Cabin, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, 1 block from golf course, swimming pool & riding stables, $30 weekend; $80 wk. Palos Verdes, FR 7-3888. E

Apt., 1 & 2-bdrm., 10 mins. from Nortronics PV, furn. & unfurn., $75-$125. Torrance, FR 5-2091, 375-9397. E

Apt., 2 & 3-bdrm., children & pets OK, 2 baths, all elec., from $135. Torrance, 370-4747. E

Rentals Offered

Apt., on Bass Lake near Yosemite, pvt. entrance, deck, dock & boat mooring, sleeps 7, ½ mile from main village, $100 wk. for 2, $125 wk. for up to 7 persons, Rolling Hills, 377-2101. E

Apt., 1-bdrm., unfurn., triplex, 1-level, lge. rooms, pvt. patio, carport, laundry rm., adults, $78.50. Gardena, DA 9-9195. E

Apt., 2-bdrm., deluxe, lower, washing fac., walking distance to Northrop & shopping, sundeck, $115. Hawthorne, OS 6-2948. E

Apt., 2-bdrm., modern, deluxe, garage, $98. Hawthorne, 675-1782. E

Apt., 2-bdrm., deluxe, pvt. garage, laundry rm., walk to Northrop, $110 mo. Hawthorne, OS 5-3792. E

Apt., 1-bdrm., utilities paid, washer, dryer, & pool, 1½ miles from Northrop, unfurn. $100; furn. $120. Hawthorne, OS 9-7123. E

Apt., 1-bdrm., deluxe, pool, $95 mo. Redondo Bch., 376-2117. E

Vacation Cabin, Green Valley Lake, $55 wk. Torrance, 320-2002. E

House, 2-bdrm., large fenced yard, newly decorated, water & trash paid, $115. Hawthorne, 675-3725. E

Apt., 2-bdrm., walking distance to Northrop, 2 bath, large exec-type, closed gar., $130. Hawthorne, 676-9620. E

House, 2-bdrm., unfurn., rear, stucco, garb. disp., gar., water, lawn & trash serv. incl., 2 children OK, no pets, close to Northrop. $107 mo. Lawndale, OS 6-8768. E

Beach Apt., sleep 6 & 10, Balboa, $125 & $200 wk. Inglewood, 672-3764. E

Apt., 2-bdrm., near transp., schools, $95. No. Long Bch., GA 2-0544. E

Studio Apt., 2-bdrm., 2½ baths, deck, subterranean gar., adults, near San Diego Fwy., lease, $175. Inglewood, 373-1143. E

Personals

Flying Bonanza to Ohio Sept. 3-13. Need 2 passengers to share expenses, $130 ea., round trip. Playa del Rey, 397-6326. L

Ironing in my home, 2 blks. from Norair, $1 hr. Hawthorne, 675-6291. L

Working girl wanted to share home w/same, 1 child OK. Anaheim, PR 2-1908. L

I Wish to extend my deepest appreciation for the thoughtfulness, phone calls, & many get well wishes sent during my recent illness. J. W. (WES) SMITH & FAMILY L

Young woman, 23-27 to share 3-bdrm., 2-bath home, pvt. room & bath if desired. $70. Newbury Pk., 805-498-2879. L

House, 2-bdrm. & den, share w/1 person, $65 mo. Lawndale, 772-5027. L

Share 3-bdrm. house, furn. w/2-3 other men, 5 mins. from Norair & Johnson facilities, incls. utilities, $50 single, $35 ea. double. Hawthorne, 676-0418. L

Share 3-bdrm. apt. w/3-4 men, furn., on beach, $185 mo., Playa del Rey, 391-8349.

For Sale or Trade

M-1 Carbine, 30 cal., $65 or trade for pistol or Winchester carbine. Manhattan Bch., 372-3878. M

T-Bird, 1957, full power, a/c, h/top w/portholes, Firestone premium tires, $1425 or part trade for Continental or Mark II Lincoln. P.V., 377-6222. M

House, 3-bdrm., 1½ baths, red. interior, cooler, garb. disp., fenced yard, in Palmdale, $12,500 or trade for home in South Bay area or Orange County. Box 1302. M

Piano, consolette, walnut, $295 or trade for bicycle, motorcycle, tools. Hawthorne, OS 6-5253. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

8 a.m. — 4:45 p.m.

Hawthorne & Lennox Blvd., Hawthorne. Bonnie Conlon, Norair, ext. 617, 375-3744. 5

Victory & Platt Ave., Canoga Park. Will consider car pool. Donald C. Gill, Norair, ext. 1829, DI 7-3193. 5

Sepulveda & Devonshire, Granada Hills. Bob Rothstein, Norair, ext. 650, 360-1377. 5

Shoup & Victory, Canoga Park. Melvin D. Sadowsky, Norair, ext. 1752, 348-8588. 5

Sunset Blvd. & La Cienega Blvd., W. Hollywood. Kurt H. Meissner, Norair, ext. 4270, OL 4-1842. 5

3:45 p.m. to 12:15 a.m.

Chapman & Alameda, Orange. Larry Slininger, Norair, ext. 2408. 6

Rides Offered

7:30 a.m. — 4:15 p.m.

Ball & Crescent, Buena Park, 1 or 2 passengers. D. H. Eaglin, Norair, ext. 2655, TA 8-2857. 13

8 a.m. — 4:45 p.m.

Sepulveda & Devonshire, Granada Hills. Bob Rothstein, Norair, ext. 650, 360-1377. 15

Shoup & Victory, Canoga Park. Melvin D. Sadowsky, Norair, ext. 1752, 348-8588. 15

Sunset Blvd. & La Cienega Blvd., W. Hollywood. Kurt H. Meissner, Norair, ext. 4270, OL 4-1842. 15

Crenshaw & Wilshire Blvd., Los Angeles. C. M. Spindel, Norair, ext. 2522, 465-8023.

3:45 p.m. to 12:15 a.m.

Chapman & Alameda, Orange. Larry Slininger, Norair, ext. 2408. 16

Palmdale Hosts Ladies Gathering

Approximately 45 of Northrop's fairest, including 25 from the Los Angeles area, gathered in Palmdale late last month in what has become an annual get-together for Northrop women.

Antelope Valley fems planned the affair which included an around-the-pool motif with a buffet, a unique fashion show, and a tour of the Palmdale facility with Superintendent Al Graber acting as guide.

Previously, similar events have been held in Northrop Ventura and Northrop Hawthorne complex areas.

FIRE SAFETY

Northrop Norair's Safety and Fire Prevention branch recently completed installation of a new safety device on cigarette cans shown. Wire cover, spotwelded in place, prevents loss of covers formerly used, discourages dropping paper and other waste in cans. Minor fires resulted in past when cigarettes and matches ignited waste in cans.

HIGHER DISABILITY TAXES IN EFFECT

Northrop California employees will note that larger amounts are being withheld from their paychecks to cover California State Disability Insurance.

California's State Legislature recently voted to increase the applicable tax rate from 1.0 percent to 1.1 percent for the remainder of 1965 and to boost the taxable income limit from $5600 to $7400.

Northrop Payroll organizations will use the new rate in computing deductions (under SDI paycheck stub heading) effective August 1. Those employees whose income had already exceeded $5600 exempting them from further deductions this year under the old law are also affected.

On January 1, 1966, the rate reverts to 1.0 percent, but the taxable limit will remain at $7400.

Stamp Club to Meet

Northrop Stamp Club members gather at NRC Clubhouse in Hawthorne August 16 for a regular meeting beginning at 7:15 p.m.

Plans call for a speaker, display, a swap meet and door and attendance prizes.

PIONEER: Three-in-one Parachute

(Continued from page 3)

—Low impact velocity.

When Northrop took on the assignment in 1961, Vince had less than a year's experience in parachute recovery systems. Most of his first four years on his new job had been devoted to airframe design for target drones.

When assigned as project engineer on the steerable parachute program, he soon found himself back in familiar territory, however. He began conducting tests on parachute configurations at the Norair wind tunnel, a place he had frequented for more than four years while assigned to the X-21 laminar flow control aircraft program from 1953-1957.

By this time Gene Linhart had joined the Northrop team after earning his master's degree in aerodynamics at the University of Minnesota, and Vince had absorbed about all that was known about gliding parachutes at the time.

Through the remainder of 1963 and into the early months of 1964 the work continued.

Vince was testing the different configurations, and Gene was responsible for aerodynamic analysis of their performance.

"If we had been designing an airplane, it would have been a lot easier," the men said. "We would have had numerous references and the results of previous experience to begin with.

"As it was, all we had to work with was our own experience in a field that was new to the entire industry."

But in less than a year the newest configuration had achieved a glide ratio of 2.1:1.

This was the Cloverleaf, a cluster of three parachutes stitched together to form a single canopy. In addition to the new configuration, the Cloverleaf uses a low porosity material that differs considerably from materials used presently in Gemini and Apollo recovery systems.

Another major contribution to the Cloverleaf's high glide ratio is its pointed leading edge as opposed to blunt-edged conventional chutes, Mr. Riley said.

Controlled landing of space vehicles is only one potential application of the Cloverleaf, Vince and Gene point out.

Recovery of booster rockets on land and undamaged could save the U.S. millions of dollars annually.

Pinpoint landing of supplies from aircraft in limited warfare environments is an area of exceptional potential for the Cloverleaf, the men said.

Also, high altitude instrument systems could be steered toward a ground beacon.

Since the steerable parachute is still in the research phase, its impact on defense and space programs cannot be fully determined.

But the pioneering chapter in its history can be written, and it introduces into the over-all history of paradynamics a couple of guys named Riley and Linhart.

Gem, Mineral Club Sets Trip, Fishout At Jalama Beach

Members of the NRC Gem and Mineral Club will stage their annual Field Trip and Fishout August 21-22 at Jalama Beach County Park north of Santa Barbara.

Of special interest to the rockhounds will be beach agates, petrified whalebone, and banded honey and brown travertine found in the area.

Anglers will compete for prizes in three divisions, men, women, and children under 16 years of age.

Ample camping sites will be reserved for Norair, NSL and Nortronics participants. Although water is available at the campsite, it is sulphurous. Commissioner Dan Kozlow suggests campers bring their own drinking and cooking water.

Directing activities will be a host and hostess.

Jalama Beach County Park is approximately 16 miles off California Route I.

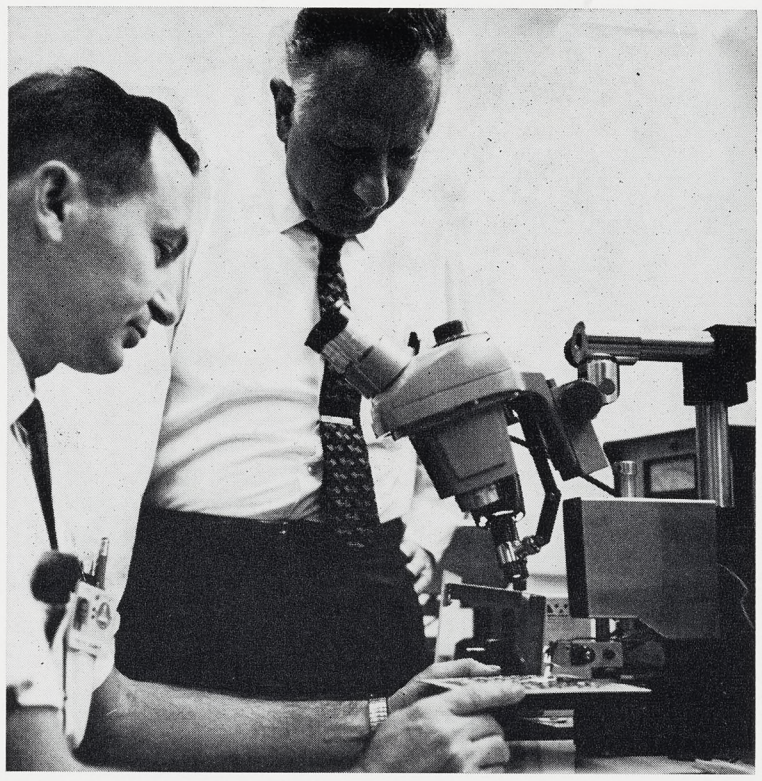
Contract Auditors Consolidated Into Single DOD Agency

Contract audit activities of three military department audit agencies have been consolidated into a single agency under the authority, direction and control of the Secretary of Defense.

Called the Defense Contract Audit Agency, the independent agency is now responsible for performing all contract audit services within the Department of Defense and other government agencies concerned.

Henry A. Wallace has been named regional manager of the Los Angeles Region of the new agency. Mr. Wallace announced that Miss Eunice E. Stockman, with offices in Hawthorne, will continue as the resident auditor for the company. In addition, John Nosk, with offices in Newbury Park, continues as supervisory auditor for Northrop Ventura and the Applied Research department of Northrop Nortronics.

The consolidation will bring about uniformity in the administration and performance of contract audit activities which will be of material benefit to defense contractors.



NEW TECHNIQUE—Paul Eckroth (left) and Harry Salinger demonstrate parallel gap welding equipment at Anaheim.

TEAMS: Integrated Circuits Pose Challenge to Fabrication

(Continued from page 1)

tronics. The changes in printed circuit processing has also presented an additional bonus in substantially lowering costs of processing and materials as well as improving production yields.

The switch to integrated circuits in the logic section of automatic checkout equipment, while increasing reliability and speed of operation, poses a challenge to circuit board fabrication which probably could not be met satisfactorily when using present soldering techniques, Mr. Salinger stated.

Each printed circuit board will require 420 weld connections to the nickel-plated conductors. The size of an integrated circuit pack is $\frac{1}{4}$"x$\frac{1}{4}$"x1/16". One of the advantages of the welding process is that connections can be made in an area having limited space. In soldering operations "bridging" can occur when the circuit spacing is very narrow.

When using the parallel gap welding technique, the time span for electrical heat input into material to be joined is of the order of one millisecond. The machine control settings can be accurately programmed for electrode pressure, electrode gap, voltage and weld duration.

As for the over-all system, TEAMS is similar in many ways to equipment designed and produced by Nortronics to monitor Polaris missile systems readiness.

Keg Leagues Filling Fast, Better Hurry

Time is running out for entering NRC-sponsored bowling leagues which begin rolling in the Hawthorne area the first week in September.

Commissioners representing both Norair and Nortronics (Hawthorne) indicate openings still exist in many leagues, but will be exhausted soon.

Entry forms are presently available through Personnel Activities offices.

However, three corrections have been made on original sheets, the bowling directors note. A league slated for Wednesday at Tropicana (825 men's scratch) has shifted to Thursday night at Del Mar. A Thursday mixed five loop at Missile Bowl has a 765 average, instead of a 760. And a Gardena Peterson Points loop (mixed four) has lowered its average to 655 from 665.

Individuals, couples or teams are invited to take part in NRC keg activities, the commissioners say.

Northrop 'Hams' Plan Sundays on the Air

Preliminary efforts in the establishment of an all-Northrop amateur radio network have been highly successful, although it appears the next step may be more difficult to take.

This was the comment of Paul Staudenmayer, NRC Radio Club commissioner at Nortronics (Anaheim) who has led organizational efforts to date.

"We asked for names, call letters and addresses of all Northrop amateurs who would like to take part. We received more than 84, with people located almost around the world," Mr. Staudenmayer said. "These names have been incorporated into a master list and copies sent to all who contacted us."

Next step, Mr. Staudenmayer said, was to work out a suitable operating mode, time and frequency acceptable to all. This will be the master step.

Until sufficient opinions can be obtained, the amateurs are going on the air each Sunday at 1701 PDST or 2001 EDST.

Plans call for the use of the following frequencies: 146.02 mc phone; 50.304 mc phone; 21.413 mc phone; 14.313 mc phone; 7.210 mc phone; 14093 cw; or 7110 cw.

There will be no net control. Stations will simply call "CQ. NRC" in an attempt to contact other members.

Following initial contacts and further suggestions, some sort of more definite arrangement will be worked out, Mr. Staudenmayer said.

Meanwhile, listen in Sundays.

CAYER

(Continued from page 1)

serve in the pit crew of Mr. Stevens.

The love of mechanically-perfect vehicles is really a Cayer family trait. Floyd Cayer, jr., also a Nortronics (Anaheim) employee and Daniel Cayer, 18, share their father's enthusiasm.

(Editor's note: At last count there were six automobiles and one motorcycle at the Cayer home in Anaheim and only four people to drive them. Also just departed was a racer the Cayer's have been overhauling for some time.)

While cars are a family tradition, there is still time for other things with the Cayers. There is always a neighborhood football or baseball game in progress and soon the family will have a new boat for water skiing.

OUR FACES RED; LONG IS STONE

Oops . . . Our typos are showing.

Northrop NEWS (June 30) identified a man receiving a 20-year Northrop service pin from Treasurer Don Lewis as Fred Stone.

As several eagle-eyed readers have informed us, it was really Fred Long. So FRED LONG, our apologies, congratulations and best wishes on passing this milestone.

Blood Bank Slated For Two Shifts; Goal Is 500 Pints

A "two shift" Northrop Blood Bank program has been scheduled for September 14 and 15 with solicitations for donors to begin in the near future.

In order to afford both first and second shift employees an opportunity to donate blood, the Blood Bank will be operated from 4:30 to 9:30 p.m. September 14 for second shifters. Those on first shift may donate during a regular visit from 7:30 to 11:30 a.m. September 15.

Blood Bank operations will be carried out in the Norair Product Display building. The immediate goal is to raise 500 pints to meet Northrop's requirements for the next quarter.

CHARITY

(Continued from page 1)

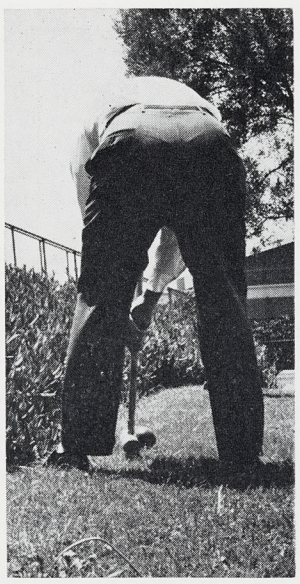
Palos Verdes, Anaheim, Cape Kennedy, Florida), and Northrop Space Laboratories (Hawthorne and Huntsville, Alabama).

This campaign will also afford employees an opportunity to become AID-NORAID "Members at Standard."

Prior to the beginning of the Northrop "Tencennial" AID and NORAID campaign, several hundred select employees will be enlisted and briefed. They will become campaign leaders to carry out solicitations in their respective work areas.

ANCIENT SPORT ATTRACTS SCIENTISTS

Lunch hours at Nortronics (Palos Verdes) normally finds this quartet, and others, enjoying ancient game of croquet while juggling noon meal. This group includes, from left, Ed Horgan, Ted Campbell, Dan Dennis and Paul Engelder. Game always calls for just the right amount of body English.



This might well be any one of a dozen croquet enthusiasts in a carefully played shot.

Ted Campbell calls into play all of his engineering background to get just the proper trajectory, range on wooden ball.

Landscaping at Palos Verdes creates additional hazards to be contended with as one croquet player lines up a shot and another watches. It would be hard to find a more beautiful setting for lunchtime relaxation.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California Vol. 23, No. 14 August 25, 1965

Karin Earns 2d Highest Army Honor

Bert Karin, chief of the Munitions Development group at Northrop Nortronics (Anaheim), has received the second highest award the U.S. Army can bestow upon a civilian employee.

Mr. Karin

This award, called the Department of the Army Decoration for Meritorius Civilian Service, was presented July 30 at ceremonies held at Pecatinney Arsenal, Dover, New Jersey.

The citation accompanying the medal presented at the ceremonies recognized Mr. Karin's contributions from 1957 to 1962 on the Selected Ammunition Program.

The citation noted this program represents one of the highest priority and unique undertakings in the history of ordnance. It revealed the work covered the spectrum—from research and development to the production line.

"This unique accomplishment in the scientific and engineering area—including some major technological break-throughs and advancements in the state-of-the-art — could not have been achieved without his (Mr. Karin's) efforts," the citation continued.

Major General F. A. Hansen, commanding general of the U.S. Army Munitions Command, signed the citation and took part in the presentation ceremonies.

Mr. Karin was employed at the Pecatinney Arsenal and was Laboratory Chief, Warheads and Special Projects Laboratory, prior to resigning to join Northrop in 1962.

Eight civilian employees of the U.S. Army were honored at the special fete.

Mrs. Karin accompanied her husband to receive the award.

AIR FORCE T-38'S LOG HALF-MILLION HOURS IN FLIGHT

A half-million flight training hours—

This important milestone flashed by during August for the Northrop-built T-38 supersonic trainers operated by the Air Force's Air Training Command (ATC).

To mark the occasion ATC Commander Lieutenant General William W. Momyer took the controls of a T-38 for a flight at Randolph AFB, Texas. At dual controls was Captain Edward W. Wooke of the 3510th Flying Training Group.

Since 1961 the twin-jet has served as the Air Force's basic flight trainer and its first supersonic aircraft ever used in undergraduate flying training. The Air Force has indicated more than 600 T-38s will be assigned to its ATC operations by mid-1966.

AFCEA Fellowship Winner Spending Summer at PPD

A 1965 winner of an Armed Forces Communications and Electronics Association (AFCEA) fellowship is gaining practical experience in electronic systems at Nortronics Precision Products Department prior to enrolling this fall at Rensselaer Polytechnical Institute.

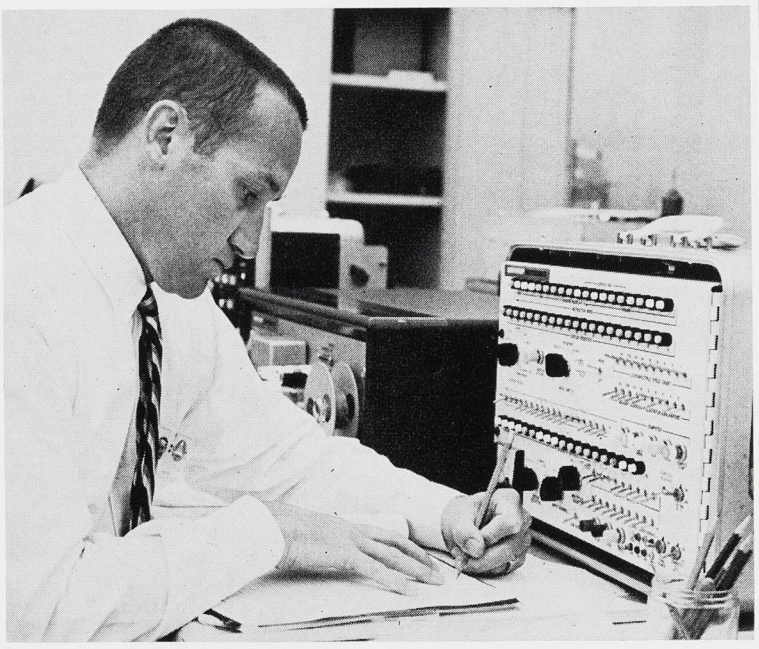
John Ullo, a spring graduate of Belmont High School, Belmont, Massachusetts, is one of four junior fellowship winners named from the Greater Boston area in the third annual contest.

Contest Chairman this year was Louis deBrigard of Nortronics' Norwood, Massachusetts, facility, who is vice president-Education of the AFCEA's Lexington-Concord chapter.

AFCEA is a non-commercial organization dedicated to military-civilian partnership with emphasis on communications, electronics and photography.

Navy to Use Display Systems For Sub, Missile Tracking

FLIP FOR SHORT



Floating Inertial Platforms (FLIP) were described by Leonard J. Baker, chief of Inertial Systems Group, during presentation at AIAA/ION Conference August 16-18 at University of Minnesota. Inertial components are isolated by floating sphere. With small general-purpose digital computer added, device becomes portable "suitcase navigator." It provides all-attitude capability.

Two large screen information display systems are being produced for the U.S. Navy by Northrop Nortronics at its Palos Verdes facility.

One system will be used for the training of anti-submarine warfare students at the Pacific Fleet Task Force ASW Training Center, San Diego, Calif., as part of the ASW simulator being produced by Lockheed Electronics Company, Plainfield, New Jersey.

The other system will be used in the Bahamas to graphically present missile and weapons testing both above and below the sea at the control center of the Navy's first underwater test range, the Atlantic Underwater Test and Evaluation Center (AUTEC), Andros Island.

Northrop Nortronics' information display systems incorporate projectors which depict movements onto screens in real-time and multi-colors. Each system is designed to perform specific display functions.

Northrop's contract from Lockheed for the San Diego display is for $316,000, and the underwater test range display system is being built under a $150,000 contract awarded by International Telephone and Telegraph Corporation, Federal Laboratories Division, contractors for the underwater range.

The San Diego ASW display is identical to a system produced by Nortronics for the Navy's ASW Tactical School in Norfolk, Va., soon to be in operation. The systems portray simulated movements of ships, submarines, and aircraft on three theater type screens as they are created by students. Others, in the simulator's command and control center observe the action, as it is presented in various colors, symbols and plots against appropriate reference information.

By comparison, the AUTEC display system now being pro-

(See CONTRACTS, page 6)

Annual AID-NORAID Drive Begins on September 20

AID is people who help people. Through NORAID Northrop people help other Northrop people.

Together they represent an opportunity for all Northrop people to support community health and welfare needs where they live and at the same time lend a helping hand to fellow employees beset by adversity.

AID-NORAID also affords employees a simple and systematic method of supporting these vital purposes through small weekly payroll deductions.

Between September 20 and October 1 Northrop Corporation will conduct its annual campaign to enlist employee support of AID and NORAID. This is the once-each-year opportunity for those who have supported this concept in the past to renew their pledges and a chance for non-members to enroll.

This year the effort is known as the AID-NORAID "Tencennial" campaign, marking Northop's 10th year as a participating member in both AID and NORAID fields.

Northrop's Corporate personnel join all Norair employees and all Nortronics West Coast and Cape Kennedy, Florida, employees in staging the drive.

In the first week of the campaign volunteer workers will be briefed and given all campaign

(See AID, page 6)

EDUCATION REFUND PLAN

Degrees Awarded to 10 More West Coast Employees

The Nortronics West Coast Training organization recently announced that nineteen of the more than 200 employees who participated in the Education Refund Plan during the past school year completed their programs and received degrees. Nine received their degrees following the Fall 1964 semester. Ten employees earned degrees upon completion of the Spring 1965 session.

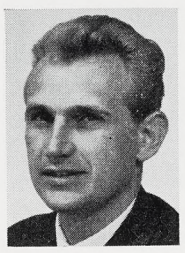
Gary Bolger received a Master of Science degree in electrical engineering from U.S.C. Gary is an engineer assigned to the Design Support and Reliability organization in Palos Verdes. He earned his B.S.E.E., also from U.S.C., while employed by Nortronics as an engineering draftsman, in June 1961. Gary was hired in November 1960 and received his first educational refund following the Fall 1960 semester.

Sherburne Brown graduated from U.S.C. with a Master's degree in business administration. He received a B.S.M.E. from the University of Arizona in 1952. Sherb came to Nortronics in August 1961. He works in Contract Estimating-Spares and Analytical at Anaheim as a cost analyst.

Richard Cormier received his Bachelor of Science degree in marketing from California State College at Long Beach. He was hired in October 1962 and began study under the Education Refund Plan shortly thereafter. Dick is a supervisor of Contracts Administration at Palos Verdes.

Henry Greenberger earned his Bachelar of Science degree in engineering from U.C.L.A. He also holds a B.S. in chemistry from the University of Nebraska, which he received in 1940. To follow a natural interest in electronics, Hank began his studies at UCLA in 1957. He has participated in the Education Refund Plan since

(See EDUCATION, page 6)



Mr. Kolderup

Mr. Brown

Mr. Salisbury

Mr. Grenberger

Mr. Pfeil

Mr. Kanitz

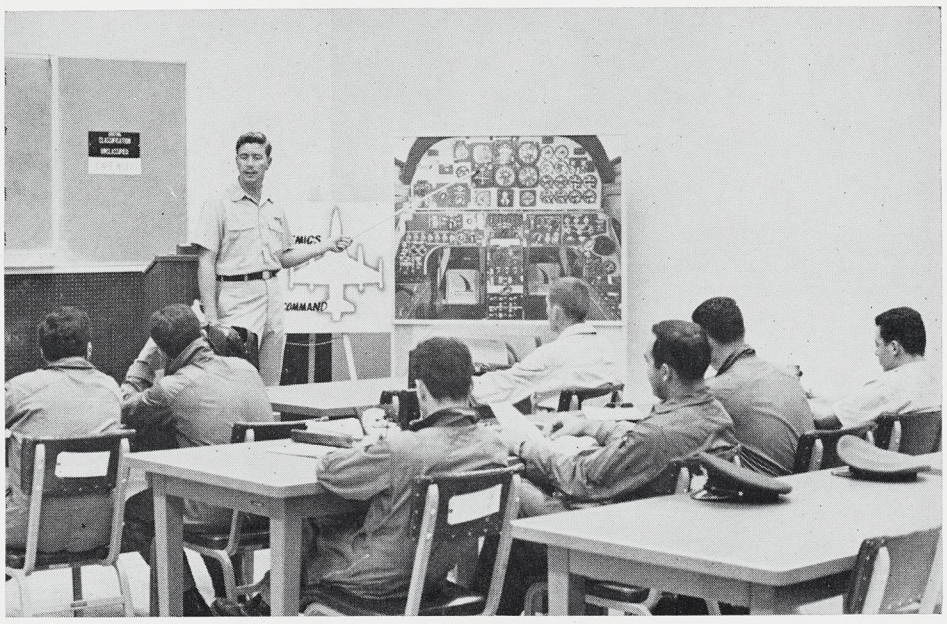
Mr. Bolger

Mr. Cormier

Mr. Sanderson

Mr. McNew

Williams AFB, Arizona, home of the 4441st Combat Crew Training Squadron (CCTS), is point where cadre from allied nations slated to receive Northrop's F-5 go through specialized training. Pilots take part in one course, maintenance technicians in another. The group above from Turkey are maintenance men at work on-the-job. Men (from left) are Y. Usluduran, Y. Keskin, A. Erguder, S. Kunduraci and A. Durhan. Heavy classroom schedule is augmented by actual maintenance work on the F-5.



U.S. Air Force instructor above goes over cockpit layout of F-5 with pilots from Turkey, Norway and U.S. Air Force during classroom session. Together, they then move to flight line and into the air for further training which includes everything from formation flying to weapons delivery and combat tactics. Graduates return to their own countries to conduct similar training prior to arrival of first F-5s for operational use. Allied nations have been sending personnel to this school for 15 months.

Combat Crews Learn Skills at Williams AFB

DEFENDERS OF FREE WORLD LEARN TACTICS, TECHNIQUES FOR FUTURE

By W. J. B. WEICKERSHEIMER
Staff Writer

Men attending the 4441st Combat Crew Training Squadron (CCTS) at Williams Air Force Base, Arizona, serve many nations, but are united in their dedication to a common cause—the defense of the free world.

For the past 15 months they have arrived there from Iran, Greece, Nationalist China and the Republics of Korea and the Philippines. Late last month a contingent from Turkey completed training, making way for a similar group from Norway.

Students of the 4441st CCTS arrive as hand-picked (by their own government) individuals, experienced pilots and veteran technicians. After approximately four months in a well-defined and meticulously planned program providing complete transitional, operational, service and maintenance training on the Northrop F-5 tactical fighter, they depart as a close-knit, well-trained team.

Graduating teams are, in a true military sense, cadre. They return to their homelands to conduct similar training programs for their own forces prior to the arrival of operational F-5 aircraft.

Williams AFB, the site of this intensive international training effort, is a unique installation.

It is operated by the Air Force's Air Training Command (ATC) which contributes to the effort by conducting academic sessions and providing base support.

The 4441st CCTS is a Tactical Air Command (TAC) organization commanded by Lieutenant Colonel C. K. Voss. It concentrates on the blending of individual skills and the versatile F-5 fighter into effective weapon systems.

This welding of man and machine occurs largely through academic or classroom sessions augmented by maximum personal contact between students and U.S. Air Force counterparts. Training efforts are divided with pilots and technicians taking separate subjets.

For instance, fighter pilots spend about 100 hours in academic training, 50 hours in briefings and critiques, and 40 hours in flight training. The latter spans everything from simple transitional and formation flying to weapon systems delivery and air combat tactics.

Technicians, on the other hand, may devote as much as 250 hours in detailed academic work, augmented by hardware demonstration and on-the-job efforts. The latter involves, in the final weeks of training, actual maintenance of the F-5s being flown by their fighter pilots.

Language is a big barrier, but each student normally attends an English language and aviation English course taught at Lackland AFB, Texas, prior to assignment at Williams.

Many key U.S. Air Force officers associated with the F-5 program have taken part in training at Williams AFB. Colonel A. C. Jackson (right), former F-5 Special Project Officer, is typical. He is shown above prior to flight with Lieutenant Colonel C. K. Voss, commander of the 4441st Combat Crew Training Squadron.

Thus, the average student must be away from his native land for as much as six months to complete the entire training cycle.

Throughout the F-5 training program at Williams AFB, a mixture of nationalities has occurred. That is, students are on hand at any given time from two or even more nations, attending the same classes. In addition, U.S. Air Force personnel destined to work in some phase of the F-5 program have participated in pilot and technician training.

The group graduating last month, designated Class 65-C, was typical of past groups.

It was made up of six Turkish and one Norwegian pilots, two Turkish maintenance officers, and 49 Turkish non-commissioned technicians.

The group began reporting to Williams in April and completed its training with graduation exercises July 31.

Northrop Norair's W. L. Shuck, a technical representative who will be assigned to Turkey, attended a majority of classes involving Turkish technicians. He will be accompanied to Turkey by Paul Ristine, another technical representative.

"These men are true technicians and dedicated military men," Mr. Shuck said. "They are quick to grasp any subject and eager to learn as much as possible about the F-5."

Many of the Turkish students saw the F-5 about this time a year ago when the Northrop-leased F-5B was in that nation on a demonstration tour.

Captain Mesut Gurlman flew the F-5B in Turkey. He continues to be impressed with the F-5's rapid rate of climb.

Lieutenant Dadri Sonnur likes what he calls the F-5's "Cadillac performance."

NORTHROP NORAIR KEY CONTRIBUTOR IN TOTAL EFFORT

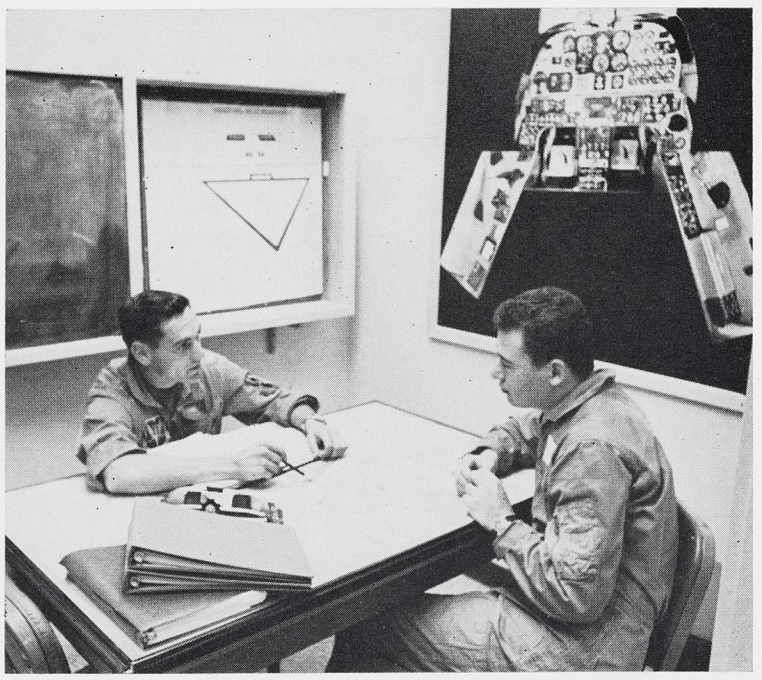
Northrop Norair currently supports the training efforts of the 4441st Combat Crew Training School "as needed", although its contributions to the over-all effort have been extensive.

Northrop Norair helped get the program under way in January 1964 by conducting special classes for future pilot and technician instructors.

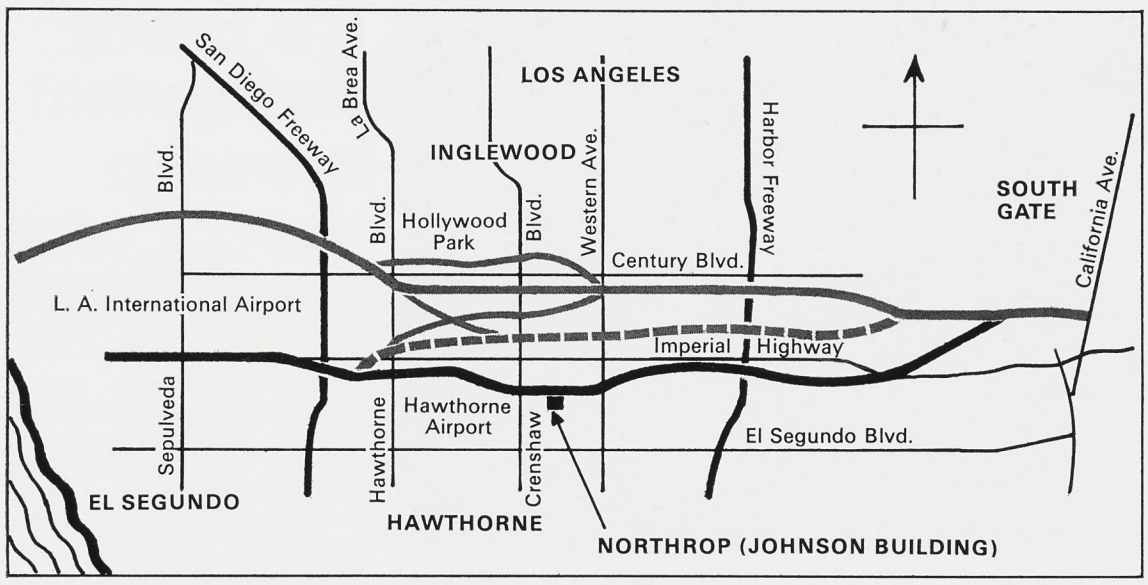
Northrop Norair designed and built the 15 special Mobile Training Units utilized in each detachment training program. In addition, Norair designed and built 15 Mobile Training Units assigned to each nation for in-country training.

Hank Waklee serves as Northrop F-5 Field Training supervisor at Williams AFB and represents all Northrop functions there, coordinating his efforts through the office of Gaylord Anderson, Product Support director of Field Service and Training.

Toward end of transitional training program, maintenance technicians move to flight lines to actually perform F-5 maintenance tasks. They work closely with counterparts from U.S. Air Force. Group above is shown performing necessary assignments in flight line shack. It includes both Turkish and U.S. Air Force personnel.



De-briefing sessions after F-5 flights are important to determine what happened in flight and why. Here Air Force Instructor, Captain Clifford Cooke, talks with Turkish Lieutenant Kadri Sonnur.



Proposed routes of freeway now known as "Freeway Route 42" could place arterial roadway within 140 feet of Johnson Building in Hawthorne, which houses delicate vibration-sensitive instruments. Northrop registered official protest to route outlined in black on map during California State Highway Commission hearing August 13.

Protest Again Lodged At Freeway Hearing

Based on a new report by a recognized authority on vibrations, Northrop has again protested a proposed freeway route adjacent to a Nortronics (Hawthorne) facility on the grounds that traffic would affect extremely delicate instruments.

The southernmost of three possible routes (designated Freeway Route 42) swings southward from Century Boulevard in South Gate, crosses Imperial Highway and runs along 119th Street in Hawthorne within 140 feet of the Nortronics facility.

Testifying before the California State Highway Commission in a public hearing August 13, Robert B. Watts, Jr., assistant general counsel for Northrop Corporation, set forth Northrop's grounds of opposition to the proposed southerly freeway route.

Northrop estimates that it would cost $348,500 to relocate the instruments to the side of the building away from the freeway. This plan could work only if experts determined that low-resonance vibrations generated within the freeway structure under a traffic load would not affect the entire building.

If operation of the facility could not continue within the same building, the costs of removal would be $988,500, according to Northrop authorities.

Neither the estimate for a move within the building or complete removal to a new building include costs incurred because of business disruption during relocation.

Northrop has maintained its position regarding the freeway route since a study by a seismology expert in 1963 indicated that vibrations would adversely affect the Nortronics (Hawthorne) plant.

The expert, David J. Leeds, performed the tests for Northrop as a consulting engineer to the architectural and engineering firm of Daniel, Mann, Johnson and Mendenhall.

The State Division of Highways conducted its own study and obtained results at variance with the study by Mr. Leeds.

A second study by the architect-engineering firm was performed by Dr. T. K. Caughey of the California Institute of Technology, a recognized expert in the field of vibrations. His findings concurred with those of Mr. Leeds.

In addition, Daniel, Mann, Johnson and Mendenhall representatives observed the tests conducted by the Division of Highways and reported that the testing equipment used by them was "completely insensitive to frequencies below 10 cycles per second."

Mr. Watts concluded his presentation to the Highway Commission:

"In view of the significant impact of this proposed freeway routing upon Northrop's critical operations in the Johnson Building, which are essential to the national interest, Northrop requests that the California Highway Commission adopt an alternate routing of the proposed freeway.

VENTURA TO HOST CATALINA WEEKEND

All Northrop divisions are invited to spend a weekend in Catalina September 18 and 19.

Hosted by Northrop Ventura, the weekend outing will begin at the "Magic Isle" terminal in Wilmington, Saturday at 1 p.m. The price is $17.50 per person, and includes round-trip fare on the steamship, lodging at St. Catherine Hotel in Avalon, dinner dance at the hotel and brunch on Sunday. Return is scheduled for 3 p.m., Sunday.

For further details and reservations, please contact personnel activities at Anaheim, extension 244; Northornics Hawthorne, extension 302; Norair, extension 2486; and Northrop Ventura, 425.

Table Tennis Won By P. V.'s Ching

Miller Ching of Nortronics (Palos Verdes) was the big winner in the all-Northrop Table Tennis Tournament staged last month at Leuzinger High School.

Mr. Ching battled his way through a tough double elimination schedule and polished off Les Emerson of Norair in the singles finals.

Then playing with Lou Villalby (Norair), Mr. Ching helped grab men's doubles honors, downing Mr. Emerson and his partner, Bernie Bowen of Norair.

Bev Barnes of Norair stroked her way through the small field of women entered to take singles honors.

Trophies went to top competitors and all Northrop divisions were represented, according to Tom White of Personnel Activities.

Saturn 'Craftsman Ship' Calls at Nortronics PPD

The importance of careful workmanship to the space program was emphasized for Nortronics Precision Products Department personnel by the arrival of the "Craftsman Ship" at the Norwood, Mass., plant.

The 40-foot van visited PPD during its tour of aerospace contractor sites throughout the country, sponsored by the National Aeronautics and Space Administration's Marshall Space Flight Center in Hunstville, Alabama.

PPD is involved in the Saturn space rocket development program, which is directed by Marshall Space Flight Center.

The NASA van contains components, materials and other illustrations of how the lives of astronauts depend on each part of a space vehicle performing according to specifications.

A map inside the "Craftsman Ship" shows the location of Saturn rocket work in 48 states. A space suit similar to those that will be worn during the Apollo manned moon shot is on display, and a dummy astronaut emphasizes the importance of each individual's work.

Other sections of the vehicle show soldering and welding, materials, rocket testing, and captive firing before actual launch. A final exhibit stresses the importance of correct packaging and shipping procedures.

A working model of a Saturn valve and a dismantled valve containing 209 parts are included. The Apollo flight plan is illustrated along one side of the van.

FAA Selects Page For Antenna Work

The Federal Aviation Agency has awarded Page Communications Engineers a contract to expand the capability of a ground/air antenna on the slopes of the world's largest dormant volcano.

The 225-foot high dual band antenna, described as the first of its kind in the world, will be erected next year on Mt. Haleakala, a favorite tourist spot near Honolulu.

Northrop Page previously had won a contract with the FAA to install a VHF antenna, but the new contract calls for UHF capability as well.

The unmanned facility will be operated by remote control from FAA Air Route Traffic Control Center in Honolulu. It will be used in transmission and reception of messages to and from aircraft flying between the West Coast and Hawaii.

It was also was announced this month that Northrop Page had received a $225,000 contract from Rome Air Development Center, New York, for a year-long study of new communications techniques involving extensive use of integrated circuits and computer-type logic.

INCLUDING A MAN NAMED NEWTON

Pioneer Leif Erikson Has Lots Going For Him

Leif Erikson has three things going for him that should ensure his veneration for many years to come as one of the great figures in the history of civilization.

Mr Newton

There is his pioneering and enterprising spirit which characterizes development of the New World.

There is the Viking concept of human dignity, the earliest forerunner of modern democracy, which Leif the Lucky and his descendants brought to the New World for the first time.

Then there is the Leif Erikson Association and its sister organization, the Leif Erikson Foundation, which since 1950 have been dedicated to encouraging and rewarding pioneering activities in the humanities.

Activities of the two non-profit organizations range from furthering public recognition of historical facts pertaining to Erikson to making an annual international award for the "most noteworthy discovery or advancement which furthers human liberty and well-being," according to Northrop's Johannes Newton, president and board member of the Foundation.

(Previous recipients of the Leif Erikson Award are General Bernt Balchen, U. S. Air Force, pioneer of the Polar air route and pilot for the Byrd expeditions; Dr. Lee DuBridge, president of the California Institute of Technology; and Dr. Glenn T. Seaborg, pioneer in the peaceful uses of atomic energy).

Among the notable achievements of the two organizations is a successful campaign to have Congress proclaim October 9 as Leif Erikson Day. Highlighting the second annual observance of the day this year will be special World's Fair ceremonies.

"It was a lengthy process, getting the Day proclaimed by Congress," Mr. Newton, an engineer on the Laminar Flow Control staff at Norair, said.

But Association members had help from some pretty impressive quarters. They first approached the Senate Judiciary Committee in 1959 to learn appropriate procedures. They were advised by the committee chairman, a senator named Lyndon Johnson.

After the long process of documenting their claim in behalf of Erikson and collecting thousands of signatures to their petition, another senator, named Hubert Humphrey, made the appeal on the Senate floor. Nine other senators, including Minority Leader Everett Dirkson, made subsequent supporting speeches.

One year ago this month the bill became law.

Mr. Newton, an Icelander by birth, was instrumental in forming

(See VIKING, page 5)

Rockhounds Of Africa Thank NRC

Special praise for the generosity of Northrop Nortronics (Anaheim) NRC Gem and Mineral Club members has been received from the Republic of South Africa.

Gryffuth E. Dovey, a teacher at the Private Bag Langlaatge Technical High School in Transvaal, wrote the words to Charles and Carolyn Brittenham which were intended for all club members.

Earlier Mr. Dovey had issued a special request. He wanted to start a lapidary workshop among youngsters in his area. But he lacked suitable rock specimens. He asked the NRC group if they would consider sending him a few samples of rocks found by the club on various outings.

In short order, NRC members gathered, packaged and shipped 85 pounds of rocks.

A letter written by Mrs. Brittenham, Club secretary, reached South Africa before the rock shipment.

Mr. Dovey wrote, "I could not believe my eyes after reading the clipping about the collection" (carried in Northrop NEWS).

"My original letter requested a few pounds of material and you big hearted generous folk have seen fit to send me nearly a hunderweight. I cannot tell you how much this will mean to the boys at the school," Mr. Dovey added.

Mr. Dovey said his next move was to build suitable machines for polishing and that ultimately finished works by the students will be exhibited in the school. He further offered to send a few specimens, stamps or coins of his area as a small token of his appreciation.

However, Mrs. Brittenham said the Club will likely decline the offer. "We have received ample payment now, knowing we have helped a group in another nation," she said.

Army Unit Announces Northrop Allocation

The 6164th U.S. Army Reserve Research and Development Unit has announced an allocation for two commissioned officers from Northrop.

Applicants for the field grade and company grade positions should direct resumes to the Unit Advisor, 6164 USAR R&D Unit, 2802 Airport Blvd., Santa Monica, Calif.

JUANITA NEWMAN EARNS CPS RATING

Mrs. Juanita Newman, administrative secretary to Michael Creamer, Director of Plans, Northrop International, has been awarded a rating of Certified Professional Secretary by the National Secretaries Association.

Mrs. Newman

This rating was granted after she completed a comprehensive two-day examination at Long Beach State College. It is shared by only three other Northrop women. Throughout the United States, Canada and Puerto Rico, there are only 3,330 secretaries who have achieved CPS status.

For Mrs. Newman, this recognition comes after two years at the University of Cincinnati, where she achieved a Certificate of Business Administration; and three years in evening classes at El Camino College, Pasadena and Long Beach City Colleges.

It is the intent of the CPS program to give recognition of planned courses of instruction and conscientious and proficient work to further professionalize the secretarial field.

Flight Museum Offers Aviation Film Fare

Continuous showings of a special version of "Those Magnificent Men in Their Flying Machines, and an animated film, "The History of Aviation," are current events at the History of Flight Museum, 9800 S. Sepulveda Blvd.

The museum is open 8:30 a.m. to 5:30 p.m. weekdays with no admission charge.

In driving the freeways on your summer vacation trip, check your freeway maps, determine your point of exit and determine the names of three exits you will pass prior to your turn-off point. This, says the Greater Los Angeles Chapter of the National Safety Council, will permit you to maneuver safely into your exit lane.

NORTHROP NEWS

Vol. 23 No. 14

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

ALUMNI MEETING—Northrop President and Chairman Thomas V. Jones (right), a Stanford alumnus, takes advantage of visit of recent Stanford graduates to Corpo rate office to talk about their alma mater. Tom Cotton (left) and Scott McBride (second from left) took part in NSL intern program. Roy Jackson, NSL vice president and assistant general manager and a Stanford graduate too, made the introductions.

PILOT, ARCHITECT, ENGINEER

Darrell Cornell Leads Three Lives

Darrell Cornell modestly admits three contrasting "flames" combine in illuminating his life.

One is lofty, swift and steeped in the elements of the dramatic. Another is slow, solid and with roots deep in the soil. The third is methodical, calculating and intense.

Mr. Cornell

Darrell Cornell is a Northrop Norair Production test pilot at Palmdale, who recently was reassigned from Ventura Division Flight Operations. He is also a graduate architect. And he holds an advanced degree in mechanical engineering.

In the early 1950's Darrell studied architecture at North Dakota State University and took part in Air Force ROTC and Air National Guard activities. In short order he found his schooling interrupted, answered a call to active duty and trained as a jet pilot.

With equal swiftness, he was back in school and graduated as an architect, busy at a part-time job with an architectural firm, in teaching architecture, and in studying for a graduate degree at North Dakota State.

It was during this time his work at the drawing boards began to result in custom homes, commercial and office buildings in the midwest.

By early 1962 Darrell found the desire to return to the air too strong to resist and his experiences in piloting the Northrop F-89 interceptor ample to land him a job as a jet pilot with Northrop Norair.

He joined a task force conducting launches of Northrop-built target drones at El Paso. When this function shifted to Northrop Ventura, he went along.

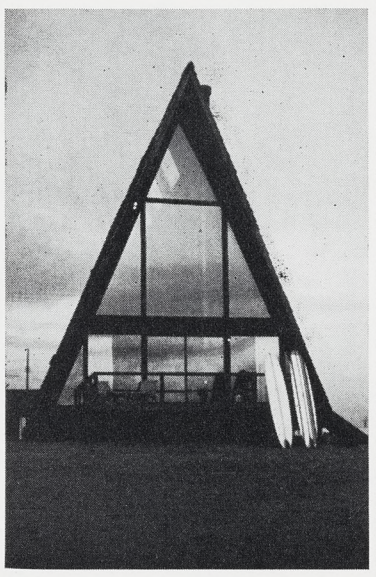
For more than three years he performed as a member of a target drone team in the United States, the Panama Canal Zone, Korea, Okinawa, Taiwan, the Philippines, and Hawaii.

"While we operated in many locales, our programs were usually well-planned and carried out with a minimum of incidents," Darrell said.

"We did encounter some suspense in operating just 50 miles from communist territory, but followed our flight plans closely and used our navigation equipment relentlessly to avoid possible incidents," he added.

Sandwiches in between period of from four to six months abroad were periods spent at the Northrop Ventura plant. There Darrell and other pilots flew light transports on equipment and passenger carrying runs in support of the Gemini and Appollo parachute recovery systems.

There were times when Darrell found himself back at the drawing boards and he dabbled in designing homes.



Isosceles ocean front home above was designed by Darrell Cornell, Norair test pilot, and built at Oxnard Shores for Dale Johnson of Northrop Ventura.

Dale Johnson, Darrell's boss at Ventura, asked him to jot down some ideas for a beach home. The ideas became plans and the plans a beach home now a welcome addition to the Oxnard Shores community.

Darrell's enthusiasm for his new assignment is shared by his wife, Beverly, and his four children, ranging in age from one month to 11 years. They especially like the idea of having him home a majority of the time.

Trio Ending Management Internship

Three top ranking Stanford University graduates will leave Northrop Space Laboratories this month following participation in a unique three month Management Intern Program.

They are Thomas A. Cotton, J. Scott McBride, and Robert G. Oakberg. According to Roy P. Jackson, Vice President and Assistant General Manager, NSL, who is also a Stanford alumnus, the program was designed to broaden the experiences of selected outstanding graduate students and to assist them in establishing their career objectives.

During their three months at NSL, the Stanford trio has been assigned to various senior NSL executives with whom they have participated in the daily decision-making processes.

The idea for the program grew from discussions between Mr. Jackson and Robert Pierce, Director of the Stanford Alumni Association.

"It is important from the company point of view that we be well acquainted with the new technical developments occurring at the universities. By having our executives face to face with these graduates, they are exposed daily to these new ideas and attitudes," Mr. Jackson said.

Dr. Jay T. Thomas, director of Physical Sciences, confirmed this as he mentioned a discussion between himself, some of his mathematicians, and Mr. Oakberg, one of the interns who is a Ph.D. candidate.

The discussion debated the merits of his thesis, a mathematical treatise on the solution of elastic structural systems by digital computer. The concept was new, and after two hours of discussion, all agreed that a significant contribution had been made.

George Muinch, director of Systems Engineering, states that he feels the objective observations by the interns are very helpful, since they are not biased by previous industry association.

Mr. Jackson added that the most significant thing for our people is to realize that there are young people in their early twenties who can work with us and understand the decisions and problems we face.

Mr. McBride was the 1964-65 Stanford Student Body President.

(See STANFORD, page 5)

NORTHROP ARCHITECTURAL SYSTEMS ON THE MOVE

Northrop Architectural Systems began its second move in its five-year history this month as the wholly-owned subsidiary occupied a new 150,000-square-foot building in the City of Industry. Most of machinery was moved (left photo) weekend of June 30 by truck over 11-mile freeway route from old facilities in City of Commerce. While movers were unloading at new $1.6 million plant, welders (center photo) were finishing storage racks for aluminum extrusions (right photo). Transfer of offices was begun August 16. With the move, plant capacity has been increased 40 percent. NAS also has installed processes, such as anodizing and surface treatment of metals, which has been subcontracted in the past.

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills.

Classified

Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Camper, $200, fits Chev or Ford truck, after 5 p.m. Santa Ana, 547-2707. A

Bed, single, w/ft. & hdbrds., sprgs. & matt., $10, Box 1402. A

Deep freezer, upright, 500 lb. cap., $150. Gardena, 324-6277. A

Ford, 1953, V8, 4-door, good trans., $100. Torrance, FR 5-9946. A

Engine, gas, mower or go-cart, $20. Inglewood, OR 1-2058. A

House, 4-bdrm., 1¾-bath, liv. rm. carpeted, large fenced yard, 2-car garage, near Trask & Golden West in Westminster, $450 dn, $17,550. Westminster, (213) DA 9-6297. A

Cooler, evaporation, automobile, w/transformer, for house use, $20. P.V., 377-3806.

Speakers, stereo, 2 walnut cabs., 2′x3′x4′, Univ. spkrs., 15″x8″x6″ w/crossover, custom-made cabs., $300 both. Lakewood, 346-9191. A

Golf Clubs, 1st Flight McGregor, woods & irons, new bag, putter & cart, $100, good cond. Manhattan Beach, 679-6883. A

Austin Healey, 1955, classic, Iskanderian racing cams, new paint, immaculate, $895. P.V., FR 5-4294. A

Motorcycle Trailer, 3 rail, $40. Bell Gardens, 773-2739, after 5 p.m. A

Studebaker Lark, 1959, r/h, overdrive, 2 new tires, $500. San Pedro, TE 2-3177. A

Organ, Baldwin model 40, Orga-Sonic, w/percussion, philippine mahogany w/matching bench, $695. Redondo Bch., FR 5-3914. A

Sprite, 1959, r/h, $600. Lawndale, 370-6472. A

Radio, c.b., Oslon Spotter "2", 6/12 volt base loaded, antenna M-123, w/5 stations incl., $90. Gardena, DA 4-9593. A

Ford, 1957, convert., 58 Merc. block, 332 cu. in., merc. hvy. duty trans. auto., b/w tuck & roll, 411 rear end, $500 or best offer. Torrance, 370-4101. A

House, 3-bdrm., 1¾ bath, 2 car gar., near schools and Harbor Frwy., pool, 6′ fenced yd., $28,500. Lomita, DA 9-9621. A

Chev., 1954, Bel Air, good condition, $150. Hawthorne, 676-4273. A

Boat, 12′, fiberglassed, blue, w/trailer, $150. Gardena, 324-7053. A

Chevy, 56, 4-dr., V8, pwr. glide, o/hauled, available September 25th, $300. Hawthorne, Box 1401. A

House, 3 bdrm., 1¾ bath, built-ins, fenced yd., $26,500. Torrance, DA 6-7600. A

Sofa, 9′ Riviera uph., beige, $130. Encino, ST 3-9762. A

Sunbeam Alpine rdstr., 1955, rebuilt trans. & front end, new tires, $425. Inglewood, OR 2-6188. A

Hide-A-Bed, Simmons, king size, $35. P.V. Ests., FR 5-5097. A

Movie Camera Equip., Bell & Howell, auto. load cartridge. opt. eye, pistol grip, w/projector, Director series, telesonic remote control, $250. Hawthorne, OS 6-3290. A

Guinea Pig, Peruvian Cavy, black, long-hair, male, approx. 4-mos. old, $2. Gardena, 329-9484. A

Refrigerator, Westinghouse, freezer top, single dr., $50. Torrance, DA 6-5004. A

Ford Galaxie 500, 1964, r/h, w/s/w, auto. trans., $1850. Hollywood, 656-3475. A

Ford sedan, 1947, custom int., flathead V-8, 15,000 miles, $375. Torrance, FR 8-1350. A

Accordion, Scandalli, 120-bass, case, $125. Los Alamitos, GE 1-4233. A

Bicycle, boy's 26″ Schwinn, 10-spd., derailleur, $25. Inglewood, PL 6-7681. A

Stereo, am/fm tuner, dual amps., dual preamps., 4-spkrs., turntable, $65. Hawthorne, 676-0418. A

Tire Set, 4, near new 5.20 x 12, 2 tubes, Michelin & Pirelli, $25. Manhattan Bch., DI 6-8129. A

Cadillac, 1957, convt., full power, factory a/c, near new tires & brakes, $550. Redondo Bch., FR 5-6773. A

House, 2-bdrm., stucco, alum. siding, 2-car gar., patio, landscaping, 50 x 150 lot, $22,000. Inglewood, 672-5798. A

Guitar, Gibson elec., case, single pick-up, $125. Inglewood, PL 6-7337. A

Bicycle, boy's 24′′, med. weight, $25. San Pedro, 833-2584. A

Property, 50x173, zoned for 3 courts, $25,000. Hawthorne, OS 6-0041. A

Record Player-radio-21″ TV comb., new picture tube, mahogany, $100. Rolling Hills Ests., DA 5-3609. A

Volkswagen, 1963, radio, $1250. Hermosa Bch., 372-5985. A

Sunbeam Rapier, 1958, convt., 2 new Dunlop tires, extras, $295. Culver City, VE 9-5438. A

Disc Brake booster unit for 3.4 or 3.8 Jaguar sedan, $25. L.A., 645-8583. A

Jeep wagon, 1952, 4-wheel drive, r/h, hubs, F head, 4-cyl. o/hauled, $795. Reseda, 343-4422. A

Sectional, 4-pc., corner-type, red & black pepper fabric, $135. Hermosa Bch., FR 9-9553. A

For Sale

Volkswagen, sedan, late 1963, 14,000 miles, $1325. Orange, 637-3153. A

House, 4-bdrm., 3-bath, family rm., 3 car garage, fenced, ½ acre lot, $63,900. P.V., 377-6222. A

Chevrolet Impala, 1959, new tires, brakes, trans., $995. Inglewood, 676-3132. A

Home, 2-bdrm., Big Bear, split-log ext. & knotty pine int., full bath, new 30-gal. water heater, furn., financing avail., $1000 dn., $11,000. Redondo Bch., FR 8-2055. A

Model A coupe, 1930, standard, 60% restored, $600. Hawthorne, 675-5337. A

Impala, 1963, 2-dr., r/h, auto. trans., p/s, low mileage, $1795. Rossmoor, GE 1-7765. A

Pups, German Shepherd, pedigree, male & female, $50. Torrance, FR 1-1000. A

Outboard, 5 hp Johnson, $60. Hawthorne, OS 5-1057. A

Mynah Bird, 1-yr-old, says 25 words, cage, $25. Rolling Hills Ests., 673-1097. A

Power Take-off, Detroit Harvester, will fit synchrone mesh gearing, $25. Gardena, OS 5-2159. A

Mattress & box spring, Sears Seraform, 2-yrs-old, $35. L.A., EX 8-8805. A

Ford, 1957, 6-cyl., 4-dr., comp. o/hauled, $325. Hawthorne, 675-6788. A

Sofa Bed, ¾-size convert., spec. fabric, $50. L.A., 645-3986. A

Plymouth, 1958, good trans., $250. Gardena, OS 5-6241. A

Honda 90, 1964, low mileage, $250. Anaheim, 776-9598. A

Bicycle, girl's, 24″, J. C. Higgins, $10. Hawthorne, OS 5-2882. A

TR-3, 1959, convt., new tires, good top, low mileage, $850. W. Covina, PL 6-2587. A

MGTD, 1953, rebuilt eng. & clutch, 1500 miles, $425. Redondo Bch., 375-1396. A

Trailer, teardrop-type, 12′ w/awning, extras, $275. Gardena, OS 6-3472. A

Bedroom Set, Drexel, walnut, contemp. style, dble. mattress & box springs, $85. San Pedro, TE 3-5550. A

Home, 5-bdrm., 2-bath, family rm., ocean view, 2273 sq. ft., 2-car gar., 1-yr-old, $46,000 or lease $325 mo. P. V. Pen., 377-5319. A

Chevrolet, 1956, 4-dr., V-8 stick, $350. El Segundo, EA 2-4606. A

Surfboard, 9′ Bing, $80. P. V. Pen., FR 7-5075. A

Range, gas, dble. oven, broiler, grill, $45. Gardena, 675-2331. A

Stroller, used 1-yr., inc. basket & awning, $7. Torrance, 325-0039. A

Washer, RCA, Mark XII deluxe, hvy. duty, 10-cy., 2-spd., $177. Gardena, 323-9294. A

Mirror, bevelled-edge, 34″x34″, $25. L.A., 476-1635. A

Wedding Ring Set, white gold, w/6 small diamonds, $50. Redondo Bch., FR 9-5865. A

Corvair Monza Spyder, 1962, convt., 29,000 mi., 4-spd. trans., $1295. P. V. Pen., 377-6271. A

Plymouth Savoy, 1955, 6-cyl. o/drive, $150. L.A., PL 4-0078. A

Boat, 15′, fiberglass, w/Walstrong trailer, conv. top, 40 hp Evinrude, Selectric push-button shifting, extras, $1595. Hawthorne, OS 6-9895. A

Pontiac Tempest, 1961, 4-dr., stick shift, 44,000 mi., $695. Torrance, 375-0449. A

Volkswagen station wagon, 1960, $845. Redondo Bch., 379-6681. A

Table, redwood, 2 benches, $15. Hawthorne, 676-7712. A

Camera, Polaroid 800, w/flash gun & attach., $45. Torrance, FR 9-5690. A

Encyclopaedic Dictionary, 12 vol., 1897 edition, collector's item, full page illus., $25. La Mirada, WH 1-6549. A

Trailer, Aristocrat 16′, self-contained, sleeps 4, extras, $1295. Hawthorne, 676-8279. A

German Shepherd, male, 2-yrs-old, AKC reg., very good with children, $25. Orange, 637-3153. A

Ford Mustang, 1965, convert., V-8, auto. trans., p/s, r/h, mahogany dash & steering wheel, spoke hubcaps, 5000 mi., $2750. Inglewood, OS 6-0645. A

Bicycle, girls, 26″, very good con., $15. Gardena, DA 4-8853. A

T-Bird, 1955 porthole, w/'57 Pontiac eng. & trans., $995. Anaheim, 534-8982. A

Home, Moneta Gardens, 182nd & Van Ness, 3-bdrms., family rm., 2½ baths, patio, 2 fireplaces, carpeted, all elec. kit., pool, club house, exc. neighborhood & schools, 4½ miles to Nortronics, $31,000. Torrance, 327-4145. A

Dinghy, 8′ blunt nose, w/oars, $50. Orange County, 549-1000. A

Chevrolet, pickup, 1963, V-8, r/h, auto. trans., o'head rack & custom tool boxes, $1500. Torrance, 371-7205. A

Surfboard, 9′3″, 3 redwood strips, $50. Torrance, 375-9657. A

Sailboat, 14′ Omega class, fiberglass w/mahogany trim, w/custom trailer & all equip., $800. Redondo Bch., 379-7567. A

Kitchen Set, table, 4 chairs, $30. Gardena, 679-1642. A

For Sale

Austin Healey, 1956, $600. Inglewood, 672-5798. A

Violin, ¾, for school music lessons, $35. Hawthorne, 675-0136. A

Travel Trailer, 15′, $650. Lynwood, 635-8337. A

House, for sale or rent, split level, 3 bdrm., blt. ins, w/w carpets, dbl. garage, $22,500. Redondo Bch., 374-2433. A

Motor, V-8, reblt. auto. trans., for 1955 Dodge, $75. Gardena, DA 4-0158. A

Sectional, aqua, w/corner table & lamp, $40 or best offer. Inglewood, OS 6-1475, after 5 p.m. A

Wanted to Buy

Tape recorder, 2 track, 1¾ ips preferred for voice recording only, San Pedro, 835-8716. B

Boat top, convert., & boat cover for 15′ boat, any condition. Lomita, DA 6-5558. B

Roll of galvanized chicken wire. Manhattan Bch., 376-4787. B

Rentals Offered

Apt, 1-bdrm, unfurn., adults, no pets, $75-$80. Hawthorne, OS 5-1142. E

Apt, 2-bdrm., unfurn., garage, w/light duties, $100 mo. Inglewood, 677-5705. E

Apt, 3-bdrm., 2½-bath, pvt. patio, $156 mo. Inglewood, FR 7-4943, OR 8-5082. E

Apt, singles & 1-bdrm., gar., furn., adults, htd. pool, only 5 min. to Norair, $90 & up. Hawthorne, 673-3633. E

Cabin, Crestline & Lake Gregory, for vacation, sleeps 6, $60 wk. Venice, EX 1-2040. E

Apt, furn., single, util. pd., carpets & drapes, blt. ins, large closets, full bath, 5-min. walk to Hawthorne plant. Hawthorne, OS 5-3792. E

Apt., 2-bdrm., delux, priv. patio, blt-ins, carpets & drapes, fireplace, children & pets O.K., $130, Buena Park. Anaheim, 828-2440.

Apt., 2-bdrm., furn., fireplace, sundeck, ocean view in Hermosa Beach, utilities paid, $135. Hermosa Beach, 372-5808. E

Apt., delux, 2-bdrm., furn., free laundry facilities, 2 blocks to Northrop Hawthorne, $150 mo. Hawthorne, OS 9-7123. E

Apt, near So. Bay shopping center, laundry fac., 2-bdrm., $115. Redondo Bch., 375-6715.

Apt, single, furn., all-elec., ½ blk. to bch., gar., patio, no pets, $90 mo. Redondo Bch., FR 5-8938. E

Studio Apt, 2-bdrm., 2½ baths, deck, subterranean gar., adults, near San Diego Fwy., lease, $175. Inglewood, 373-1143. E

Apt, 2-bdrm., nr. transp., schools, $95. No. Long Bch., 422-6169. E

House, 2-bdrm, in rear, adults, $110. Hawthorne, 675-0617. E

Bachelor Apt, furn., walk-in closet, sep. kitchen area, closed gar., $92.50 mo. Torrance, FR 5-0867. E

Home, 3-bdrm., 1-yr-lease, $175 mo. Hawthorne, 677-4271. E

Apt, 1 & 2 bdrm., all elect., new, 10 mins. from Nortronics PV, furn. & unfurn., $85-$125. Torrance, FR 5-2091, 375-9397. E

Apt, 1-bdrm., util. pd., washer, dryer, pool, 1½ mi. from Northrop, unfurn., $100; furn., $120. Hawthorne, OS 9-7123. E

Personals

Will do your typing in my home, $2 hr. Inglewood, 673-1133. L

Opening avail. in Flying Assoc. at Orange City Airport, learn in 1964 Skyhawk, assoc. limited to student pilots. Anaheim, 714-776-8956. L

For Sale or Trade

Power take off, for 4-spd. Chevy trans., $25. Gardena, OS 5-2159. M

Rambler, 1964, 440 h/t, 14,000 mi., auto. trans., r/h, $1575 or trade up w/cash dif. Redondo Bch., 373-2130. M

Chrome Wheels, 13″ Astros, $90 or trade for 1961-'63 Corvair tires. Inglewood, FA 8-8808. M

Corvair Monza, 1965, 4-spd., AM/FM/SW radio, w/w, 110 eng., 7000 mi., $2000 or trade for 1964 or 1965 Chev. El Camino, w/air cond. Granada Hills, EM 3-6633. M

Cartop Carrier Rails, set, for compact car, $6 or trade for equivalent for full-size car. San Pedro, 831-5304. M

Driver's Test Forms For TV Show Offered

Northrop Corporation has obtained copies of the "National Driver's Test" which will be repeated on nationwide television August 30.

Test forms may be obtained through Norair Personnel Activities office and all exit gates. Also at Industrial Relations functions at Northrop Ventura and Northrop Architectural Systems.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:30 a.m. — 4:15 p.m.

Xemino & 5th Street, Long Beach. Hoyt F. Shaw, Norair, ext. 1293, GE 9-6018. 3

8 a.m. — 4:45 p.m.

34th & Manhattan Ave., Hermosa Beach. Bernard F. Trudeau, Norair, ext. 2066, 372-1996. 5

Hawthorne & Lennox, Lennox. Bonnie Phillips, Norair, 617. 5

VIKING: Sister Associations Venerate Name of Erikson

(Continued from page 3)

the Association and has twice served as its president. The Foundation came into being as a separate organization in 1954.

With members in 25 states, Iceland and Norway, the group is working at present to become even more international. Affiliates are presently being organized in England, Germany and Canada, and the Foundation is planning to increase its board of directors from the present 12 members to 25.

The group also sponsors a scholarship in humanities at UCLA, which is awarded on the basis of "potential to help others."

While the Leif Erikson spirit is not confined to descendents of the Vikings, Mr. Newton himself grew up with it.

"Most every boy in Iceland, as well as Scandinavia, plays 'Vikings' much the same way American boys play 'cowboys and Indians,' he said. "Many times as a child in a make-believe world, I sailed to Vineland (the name Erikson gave to the land he discovered on his first voyage to the North American continent around 1000 A. D.)."

Glenn Seaborg probably best summed up what it is the sister organizations are trying to promote. In his acceptance speech at award ceremonies last January he said:

"Every age has its new horizons, its undiscovered shores, and its new frontiers. And each new age produces its own breed of fearless explorers. Though their journeys have differed in nature, men such as Galileo, Newton, Einstein, Fermi, Columbus, Perry, Piccard, Hillary, and Glenn all carried with them something of the spirit of Leif Erikson and the men of the long-ship.

"Today the future offers new and greater challenges. The horizons are wider, the distances farther. But these yet undiscovered shores will be discovered. They will be discovered and explored, not only because they are there, but because whatever exists and is unknown is a true challenge to the mind and body of man."

STANFORD

(Continued from page 4)

His home is in St. Louis, Missouri, and he plans to continue his education at Harvard Graduate School of Business Administration.

Mr. Cotton is a Phi Beta Kappa and was selected as the outstanding student of the year. He will continue his studies at Oxford as a Rhodes Scholar. Upon completion of his work in England, he plans to continue graduate work in engineering. Tom is from Dallas, Texas.

Mr. Oakberg is also Phi Beta Kappa. He graduated with great distinction in engineering from Stanford in 1962 and has since been working toward his Doctorate which will require one more year. His home is Coeur d'Alene, Idaho.

FORMER F-5 PROJECT PILOT JOINS X-15 STAFF

Air Force Captain William J. Knight, a former project pilot on the Northrop F-5 tactical fighter at Edwards AFB, has been selected to join the X-15 NASA-USAF research program.

Also named to the X-15 flight team was William H. Dana, a NASA civilian pilot - engineer, who flew the plywood M2-F1 lifting body vehicle which was a forerunner of the Northrop-built M2-F2 manned lifting body vehicle slated for flight test later this year.

Northrop's F-5 can operate from short, semi-prepared or unprepared fields in forward battle areas. This picture seems to indicate such a condition, but is an illusion created by the lens of Ron McGaffin. F-5B above rests on hard-surfaced strip at Brusten, Belgium, during recent Europe demonstration and evaluation program.

Donors Seek To Re-Build Blood Credit

The summer months with their high ratio of accidents and preplanned surgery have served to reduce Northrop Blood Bank reserves.

Volunteer donors will shoot to rebuild an adequate reserve with the American National Red Cross September 14 and 15 through a planned bloodmobile visit at Northrop Norair.

This will be one of the rare occasions when both first and second shifts will be able to supply donors at the same time. The bloodmobile will operate September 14 (from 4:30 to 9:30 p.m.) for second shifters and September 15 (from 7:30 to 11:30 a.m.) for first shifters in the Norair Product Display building.

Donors are currently being sought from through Northrop with application cards for this purpose currently available at various points.

Marie Tully, Welfare coordinator, indicated this week a goal of at least 500 pints is being established. This will be sufficient to re-build the reserve and carry normal withdrawals until the next quarterly bloodmobile visit.

Donations made during the visit will not only help to build Northrop's credit through which employees and their families may obtain blood without charge, it also serves to establish a personal credit for the donor.

The latter enables the donor to designate his blood be used for any purpose and by any individual. And this is possible throughout the United States through Red Cross Chapters.

Toastmasters Issue Blanket Invitation

Northrop Toastmasters this week extended a special invitation to all Northrop employees interested in developing better listening, thinking and speaking to take part in their regular activities.

This group meets at 6:30 p.m. each Thursday at the Cockatoo Inn, Hawthorne. Bill Justice, ext. 1805, or Carl Peace, ext. 1446, both Norair, will provide special information.

WINNER FROM P.V.

Table tennis singles champion, Miller Ching of Nortronics (Palos Verdes), also joined forces with Lou Villalby of Norair to garner all-Northrop doubles victory as well. Bev Barnes of Norair took women's singles honors over small bevy of entries in tournament last month at Leuzinger High School.
(See story on page 3)

Northrop Among Leaders Lauded by White House

Northrop was among several Southern California industrial firms commended by the White House recently at a "Plans for Progress" Vocational Guidance Institute held at California State College at Los Angeles.

The Honorable Hobart Taylor, jr., associate counsel to the President, sent a special message to those taking part in a concluding seminar held July 30.

Mr. Taylor expressed his disappointment in not being able to attend and offered his congratulations and appreciation "to the Plans for Progress companies for their support and cooperation and especially to the Northrop Corporation for its leadership; to the administration and faculty of the College; and to the dedicated teachers, counselors and placement officers, many of whom gave their own time to learn how they might better serve their fellow Americans.

"Such cooperative and voluntary efforts across the land are making a significant contribution to the realization of the American dream for all citizens."

William Larrabee, Northrop Corporation vice president—Industrial Relations, spearheaded the drive which made the Institute, first ever held on the West Coast, possible.

Frank Smith, Corporate director of Industrial Relations, was spokesman for the Plans for Progress companies at the seminar.

Roland B. Scott, executive assistant to the Norair director of Industrial Relations, was a key worker in promoting the Institute. Special help was also provided by A. C. Sorenson, Northrop consultant, and Clarence Stine, supervisor of Industrial Training.

Board of Directors Declare Dividend

Northrop's Board of Directors has declared a quarterly dividend of 25 cents per share, payable September 14 to stock of record August 27.

NRC ROUNDUP

Football, Golf, Bowling Share Sports Calender

Northrop personnel in the Hawthorne complex who feel an urge to return to the gridiron about this time each fall are being sought for NRC-sponsored flag football leagues.

Commissioners Larry Beuder of Nortronics and Frank Warga of Norair announced this week practice games would be played on September 11 and 18, with league action to begin September 25.

Action will center at Alondra Park.

This year initial plans call for both "A" and "B" leagues which will include teams representing both Space Technological Laboratory and Airesearch Corporation.

Individuals or teams may obtain entry forms through Personnel Activities offices.

* * *

Two-Day Golf Match Slated for October

Beautiful courses at Singing Hills and Cottonwood in the El Cajon area will be the targets October 8 and 9 when NRC golfers swing out for October tournament laurels.

Ten foursomes will play at each course, then switch courses for action the following day. Starting times will begin at 11 a.m.

Only 20 foursomes can be accommodated and reservations will be accepted at Personnel Activities offices Monday, August 30, and thereafter until filled.

A limited number of overnight reservations are also available for the Singing Hills Lodge. These may also be reserved through Personnel Activities at Norair.

* * *

Anaheim NRC Plans Las Vegas Weekend

Northrop Recreation Club at Anaheim has scheduled another of its popular Las Vegas group excursions for September 17, 18 and 19, with deadline for reservations set for September 10.

Randy Lee, NRC Travel Club commissioner at Nortronics (Anaheim) reports the destination will be the Thunderbird Hotel on the strip.

Total cost will be $34 per person.

Included will be round-trip bus transportation, two nights' lodging at the Thunderbird, two breakfasts, one dinner and show, two cocktails and a free hour-long social hour.

Reservations are being accepted at the Personnel Activities office at Anaheim.

* * *

Hawthorne Leagues Seek Winter Keglers

Five NRC bowling leagues in the Hawthorne area still have winter league openings, commissioners from Norair and Nortronics indicated this week.

Entry forms for all leagues are available through Personnel Activities.

A Monday (6:15 p.m.) Mixed Five handicap loop at Tropicana; a Tuesday (6:15 p.m.) Men's Scratch 865 Classic at Missile; a Tuesday (6:15 p.m.) Men's 825 Scratch at Del Mar; a Thursday (4:30 p.m.) Men's 485 Scratch Trio at Del Mar; and a Thursday (6:20 p.m.) Mixed 765 Scratch at Del Mar report openings.

LONG WEEKEND

Northrop Corporation will suspend its normal operations Monday, September 6, in the traditional observance of Labor Day.

AID

(Continued from page 1)

material. They, in turn, will carry out the drive during the second week in their own areas.

This year Northrop folk will be given an opportunity to become "Members at Standard." This means simply that the member gives one-half of one percent of his weekly wage (or 12 minutes of work). For a weekly salary of $100 this would be a mere 50 cents.

Over the past 10 years generous Northrop employees have contributed well over $2 million to support community health and welfare agencies.

In addition to support afforded agencies in these widely-scattered areas, Northrop employees have made it possible to help fellow employees through NORAID. This is a means by which a portion of funds contributed to AID are made available exclusively for assisting employees who face emergencies and circumstances beyond their means.

CONTRACTS

(Continued from page 1)

duced will portray actual movement of ships, submarines, aircraft and underwater weapons and missiles on a 10-foot square "split" screen. This will allow AUTEC technicians from the U.S. Navy Underwater Ordnance Station, Newport, Rhode Island, coincident comparison of vessel and weapon movement against altitude and depth information. The United Kingdom also will test weapons on the range which extends 100 miles east of Andros Island, at a 20 mile width and a depth of 6,000 feet.

The San Diego display incorporates 24 Vigicon projectors and three 10-foot square screens.

EDUCATION: Graduates for Year Total 19

(Continued from page 1)

his hire back in March 1962. He is a project engineer at Palos Verdes.

Ralph Kanitz received his M.S.E.E. from U.S.C. He also has a B.S.E.E. from Marquette University in Milwaukee, Wisconsin. Ralph works in Development Engineering in the Automation Systems Section in Anaheim as a senior engineer. He joined Nortronics in December 1962 with his master's program about one half complete, and finished up under Education Refund.

Nils Kolderup was awarded the Master of Science degree in Electrical engineering from U.S.C. He came to Nortronics in June 1960 upon completion of his B.S.E.E. at California State College at Long Beach. Nils began work, under the Education Refund Plan, toward the master's degree within a year of his hire. He is now a senior engineer assigned to the Inertial Reference Electronics Development organization in the Special Projects Section at Hawthorne.

Bob McNew graduated from California State College at Long Beach with a Master of Science degree in business administration. He was hired by Nortronics in February 1962 upon his retirement from the Marine Corps. During his 20 years in the Marines, Bob took every opportunity for evening college work. He completed his Bachelor's degree in 1954 at the University of Maryland, and began work on his master's degree at Long Beach in 1957. He is currently on a special assignment to the Tactical Imagery Processing and Interpretations project at Anaheim as a senior engineering writer.

Wally Pfeil received his Master of Science degree in electrical engineering from U.S.C. He holds a Bachelor's degree in physics from the University of Chicago, which he earned in 1943. Wally came to Northrop in June of 1952 as a designer. He is now on special assignment for the company in Munich, Germany. Prior to his recent relocation, Wally was chief of the Advanced Computer Systems Group in the Computer Systems Section at Hawthorne. He began serious work toward his M.S.E.E. in 1962.

Bob Salisbury earned his bachelor of Science degree in general management from U.S.C. As recently reported in the NEWS, Bob began his B.S. program twenty years ago. He is now embarking upon the M.B.A. program at U.S.C. Bob joined Northrop in May 1950 and has many years of participation in the Education Refund Plan. He is a project master planner in the Master Planning organization, Special Projects Section, at Hawthorne.

Frank Sanderson graduated from UCLA's special Engineering Executive Program with the Master in Engineering degree. He received his B.S. from Manchester University (England) in physics and math in 1952. Frank came to Nortronics in September 1960 and began taking courses shortly thereafter toward an advanced degree. He was admitted to the Engineering Executive Program at UCLA in the Fall of 1963. He is an engineering specialist regularly assigned to the Advanced Computer Development organization of the Computer Systems section, Hawthorne. Frank is currently planning to undertake a program leading to the Doctor of Business Administration degree at USC, once again with the help of the Education Refund Plan.

In discussing these achievements, Hal Janssen, chief of the West Coast Personnel Compensation and Training Group, pointed out that Mssrs. Bolger, Kolderup, and Sanderson also received assistance from the Graduate Study Program.

He described the Graduate Study Program as one designed to make it possible for the employee who is studying for an advanced degree to take off work up to eight hours a week without a loss in pay.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California Vol. 23, No. 15 September 8, 1965

Nortronics Takes Over DDRR Work

Northrop's DDRR antenna program has been transferred from Ventura to Nortronics Division's Applied Research section.

The ring-shaped antenna, which can vary in diameter from a few inches to hundreds of feet, depending on transmission frequencies, is designed to eliminate problems connected with height, installation and mobility, while offering equal or better performance at all frequencies than the equivalent vertical tower which it replaces.

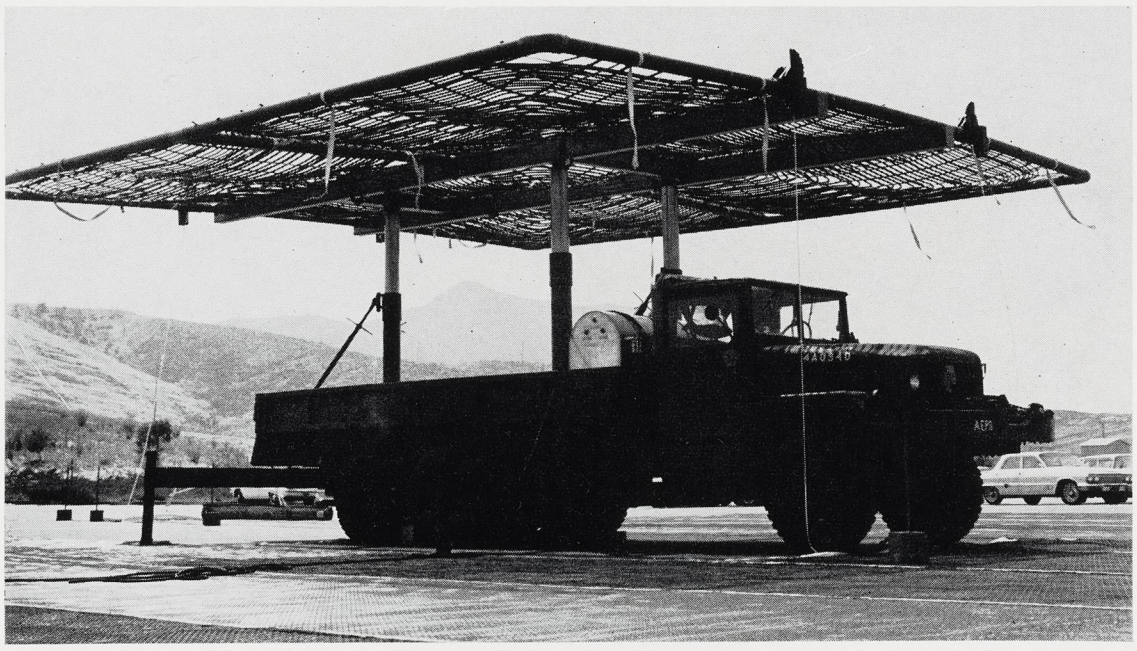
At Northrop Ventura, a prototype model was completed this summer under Army contract for fuse jamming application.

A truck mounted, low frequency jamming DDRR was also delivered to the Army this summer. Raised to a height of 40 feet by three hydraulic actuated cylinders, the antenna performs with an efficiency equal to or greater than previously used 120-foot towers, according to Stan Boyle of the Northrop Ventura Marketing staff.

Another prototype was installed last year on the Pacific Missile Range tracking ship USS Wheeling. It is a six-foot high, 35-foot diameter unit with an efficiency approaching that of a 120-foot high tower.

DDRR (Directly Driven Reso-

(See DDRR, page 6)



DELIVERED TO ARMY—One of many configurations of Northrop DDRR antenna is truck mounted, low frequency jamming unit developed for Army while program was at Northrop Ventura. Prototype unit was delivered this summer and in first test was made operational in 2 hours 39 minutes by eight-man crew, bettering 4-hour requirement.

Donors Responding To Blood Bank Call

Possibility of an "outstanding" bloodmobile visit next week is in the offing with Northrop Norair, Nortronics, NSL and Corporate donors responding to the call for volunteers.

Marie Tully, Welfare coordinator, indicated as many as 500 pints may be obtained during the September 14 (for night shifters) and September 15 (for day shifters) visits to Northrop.

FORSYTHE TV SHOW PREMIERE INCLUDES T-38 AND PALMDALE

If some of the scenes in the new John Forsythe Show which premieres Monday, September 13, on television seem especially familiar to Northrop people, there is a reason.

Part of the opening show was filmed at the Northrop Norair Production Flight Test facility at Palmdale. And a sleek Northrop-built T-38 Talon trainer is frequently seen.

Unseen in the show, but very much a part of it, is Major Roy Boyd, F-5/T-38 project officer for the Northrop Air Force Plant Representative. He was at the controls of the T-38 seen taxiing in from the runway and checked Mr. Forsythe out in cockpit egress techniques. The in-flight shots of the T-38 were provided by the Air Force Information Services Office. Major Boyd was flying the T-38 seen by the audience. The photo plane was piloted by Captain P. H. Blue, chief of AFPRO Quality Assurance.

Air Force Group Completes Computer System Course

Northrop Nortronics (Hawthorne) recently conducted a training program in the operation, maintenance and servicing of its CP-720 airborne digital computer system for five non-commissioned officers and one civilian employee of the Air Force.

Students taking part were members of the Military Air Transport Service's (MATS) 1370th Photo Mapping Wing at Turner AFB, Georgia.

Northrop's CP-720 computer is a major component in an advanced aerial electronic photo system, designated the AN/USQ-28, built for the Air Force. The AN/USQ-28 is scheduled for use in RC-135A jet transport-type aircraft and promises speed and accuracy never before attainable in the gathering of aerial photographic and geodetic information. It will be used by the MATS Air Photographic and Charting Service for geodetic missions throughout the free world.

During their eight-week stay at Nortronics (Hawthorne), the students were given a thorough and detailed course in operating and maintaining the CP-720 computer. They were taught special trouble-shooting techniques and given schooling in operating procedures, malfunction analysis, circuit analysis, etc. for all parts of the computer and its associated equipment.

Classroom sessions were augmented by visits to manufacturing and test areas.

On their final day of study (August 25), the students toured the Northrop Norair T-38/F-5 assembly line and visited Nortronics Palos Verdes for luncheon and presentation of certificates denoting completion of their studies.

The students were Marlin H. Forstrom; S/Sgt. William A. Pollett; A1C Howard E. Robinson; A1C William A. Roland; A1C James R. Barrows, and A2C Ronald W. Farley.

L. B. Proctor, Nortronics' AN/USQ-28 project engineer, was responsible for the training program. Instructors included Morris Behar, Charles Morgan, L. J. Romero, N. S. Day, R. L. Peterson, G. H. Davis, Dick French, Ray Nazaruk, and Emzley Clancy.

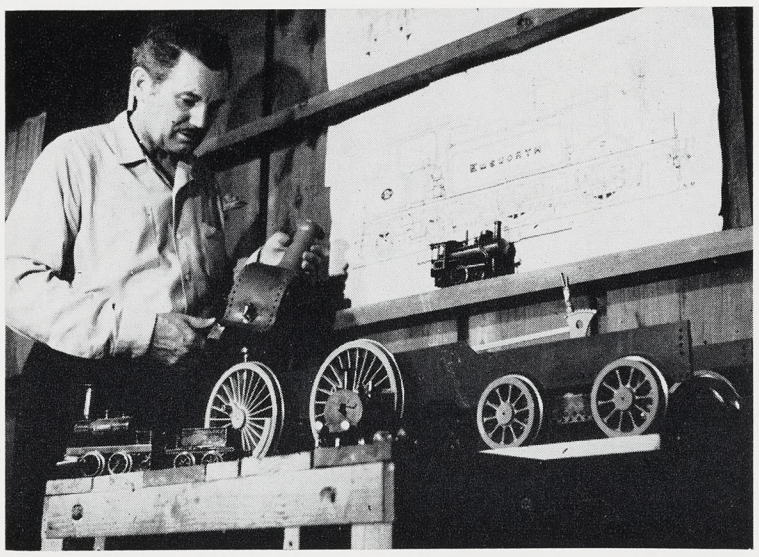
(Photo on page 6)

RAILROAD SWITCH

PV Artist Turns Locomotive Builder

E. H. "Steinie" Steinmeyer is not only an artist at Nortronics (Palos Verdes) Graphic services, he is — in his spare time — a designer, draftsman, patternmaker, lathe operator, milling machine operator and assembler.

Mr. Steinmeyer's hobby is building model trains, and a current project is construction of a 1½ inch to one foot scale model of a British locomotive built at the end of the 19th century. To do this he needs the know-how to run a complete machine shop.



Large scale model of British locomotive being built from scratch by Palos Verdes artist, E. H. Steinmeyer, will run on live steam when completed.

In his own garage, he already has completed a good portion of the locomotive, which will be almost five feet long when it's finished.

One portion of the engine Mr. Steinmeyer is not building from scratch: it was less expensive to send to England for four cast iron drive wheels at the nominal price of about $14 a set.

The big steam engine now runs on compressed air but when it's complete it will utilize live steam, a coal fire, and boiler pressure of about 90 psi.

In contrast with the big model, the artist has a toy live steamer at least 75 years old that is only

(See PV ARTIST, page 6)

Northrop Men Set For IDEP Meeting

Several Northrop Corporation representatives are expected to be on hand September 15-17 at Riverside, California, for the joint meeting of the Interservice Data Exchange Program officers and that group's Contractor Advisory Board.

This meeting, to be held at the Mission Inn, will also include a tour of the U.S. Naval Fleet Missile Systems Analysis and Evaluation Group IDEP Facility at Corona.

David Kessler of Northrop Nortronics (Anaheim) is Northrop's Board representative.

Lunar Drill Project Goes To Northrop

A unique and compact drill weighing less than 200 pounds with which future moon explorers may sample the lunar crust to depths in excess of 100 feet is under development at Northrop Space Laboratories.

Developmental efforts are being carried out under a $509,992 contract for National Aeronautics and Space Administration's (NASA) Marshall Space Flight Center at Huntsville, Alabama.

Westinghouse, holder of a similar contract, and NSL are to develop and manufacture engineering models. Eight firms had submitted bids for this work.

The final version of the lunar drill will become a key geological research tool. It will be employed in the Apollo Extension System for manned lunar exploration after the initial manned lunar landings.

Scientists believe that there have been few major changes in the lunar surface since its formation. Thus, undisturbed cores to be obtained by lunar explorers with this tool could provide important clues to the origin of the moon. This information may help resolve the many unknowns of the sublurain, including the existence of ice layers. Also, it may provide some indication as to how the solar system was formed.

Drilled holes could also be used for explosives for seismic research, for temperature and magnetometer probes, or for remote stations to be left on the moon for long duration.

NASA management of the lunar drill program is vested with the Marshall Space Flight Center, with John Bensko of the Research Projects Laboratory as principal investigator.

Northrop developmental efforts under this contract are centering at the NSL facility at Huntsville. Milton Beilock has been designated program manager with Sheldon O. Bresin as project engineer.

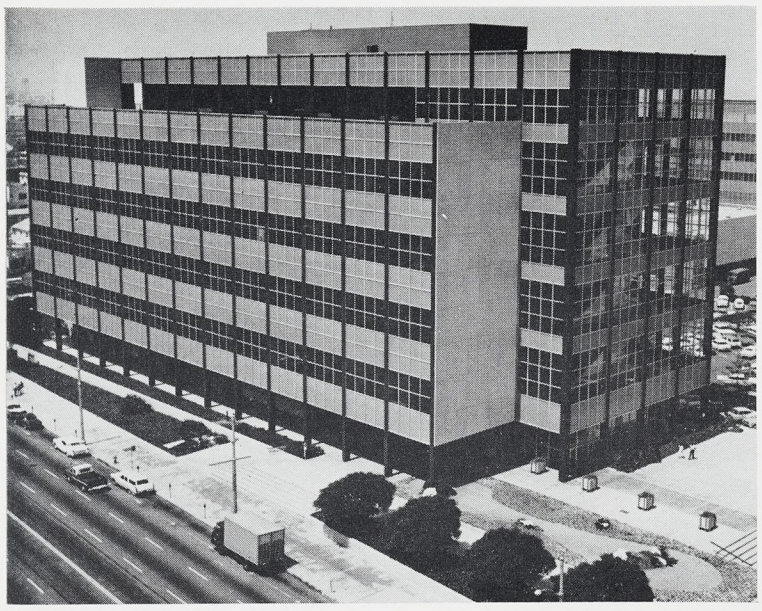
An important Northrop subcontractor is Joy Manufacturing Company, an experienced drill manufacturing concern, who will manufacture the down-hole drilling assembly. Texaco Experiment Incorporated, an experienced leader in the field of geological exploration and development is another Northrop subcontractor.

Northrop Space Laboratories has been studying the problems associated with lunar exploration for some time.

Las Vegas Excursion Deadline Is Friday

Final call for Northrop employees interested in a September 17-19 Las Vegas bus tour was sounded this week by NRC. The deadline for reservations is Friday, September 10.

Total cost is $34 and includes two nights at the Thunderbird Hotel, dinner and a show, two cocktails, two breakfasts, a hospitality hour and transportation.



Long Beach's Municipal Court Building stands near Pacific Curtainwall, Inc., Northrop subsidiary, as example of company's aesthetically designed exteriors.

Twin landmarks of downtown Los Angeles, Music Center, right, and Department of Water and Power building, were major exteriors to credit of PAC/WALL. Firm performed engineering, fabrication of hardware, wall installation.

Pacific Curtainwall: New Faces for Our Cities

While most of Northrop's divisions are busily engaged in defense and aerospace production, a subsidiary of the Corporation is decorating municipalities with a new look in building exteriors.

Pacific Curtainwall, Inc. (PAC/WALL), has participated in such projects as erection of Los Angeles' internationally famous Music Center, the renovation of a high-rise building that has landmarked San Francisco's skyline since the turn of the century, and architectural efforts on an international scale.

In 1963 the company received the American Iron and Steel Institute's Design in Steel Award for the exterior of a building in the University of California San Francisco Medical Center. Prior to that, in 1957, the company received an award for craftsmanship from the American Institute of Architects.

Pacific Curtainwall designs, fabricates and erects bearing and non-bearing wall enclosures known in the building trade as curtainwalls. Located in Long Beach, the firm has been an influence on architectural exteriors since 1955.

Ten years ago, when PAC/WALL was founded by Douglas B. McFarland, president, most buildings utilized load-bearing wall construction.

The fact that exteriors were formed as bearing walls limited architects and engineers in their consideration of aesthetics. Curtainwall came as a major improvement, permitting greater design flexibility with the added benefit of lower cost. It also lends itself to the remodeling of older structures that otherwise would have to be completely rehabilitated or demolished, or remain as eyesores within the community.

One such major face lifting

DOUGLAS B. McFARLAND
PAC/WALL President

was for the Home Mutual Savings and Loan Building at Kearny and Market streets in San Francisco. The cost to completely rehabilitate the structure was estimated at some $4 million. A curtainwall exterior was designed and erected by PAC/WALL at a cost of $140,000.

Another noteworthy exterior rejuvenation took place in Oklahoma City, Oklahoma, where the Republic Building was curtainwalled for $340,000.

Ten percent of PAC/WALL's business is such remodeling of older buildings.

Their credits for new structures include Norair's Engineering and Science Center (1957); Colon Building, Mexico City; Thunderbird Hotel, El Segundo; Providence Hospital, Anchorage, Alaska; Metropolitan Water District headquarters, and the Department of Water and Power Building, completed this year across from the Music Center.

Incidentally, the Colon Building and the Providence Hospital walls have remained undamaged through a number of earthquakes that have hit hard during the past few years.

PAC/WALL utilized 3 to 3½ million pounds of aluminum extrusions and sheet stock during fiscal 1965. In comparison, Northrop divisions engaged in aerospace work require between 3¼ and 3½ million pounds per year. The extrusions used by PAC/WALL need not meet military specifications, but they are designed and fabricated to extremely close tolerance.

The dies are designed at PAC/WALL and production of the extruded material is carried out in the plants of suppliers. Within the administrative building of the architectural subsidiary is an array of some 500 extruded samples for which the dies are valued at from $50 to $500 each, not including design hours. The mating surfaces must match precisely to fit the bearing structure and to maintain the integrity of the building envelope.

The new Music Center, for example, required 22 sheets of design drawings out of a total of 156 engineering drawings for the curtainwall. Complexity of design and construction, including two walls that form portions of an elipse, led to many hours on the drafting boards.

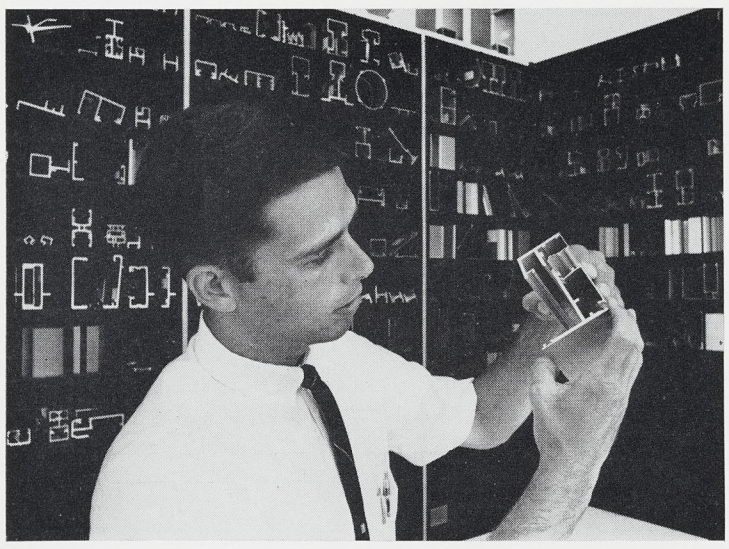
When PAC/WALL first opened its doors in an office on Wilshire Boulevard, Los Angeles, manufacturing processes were subcontracted. Only engineering and design were performed by the company.

The firm soon moved to Long Beach and in 1956, a year after its inception, began performing its own assembly work.

Now, aluminum cutting, fabrication and assembly, and steel assembly are performed by PAC/WALL, as well as coating of metals with mechanical finishes.

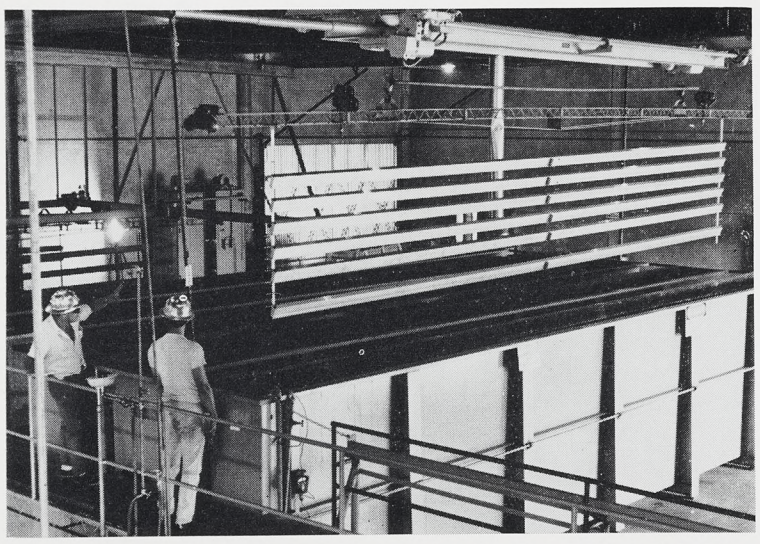
Curtainwall can be made from stainless steel or enamel-coated steel as well as from aluminum, sometimes with decorative coat-

(See CURTAINWALL, Page 5)

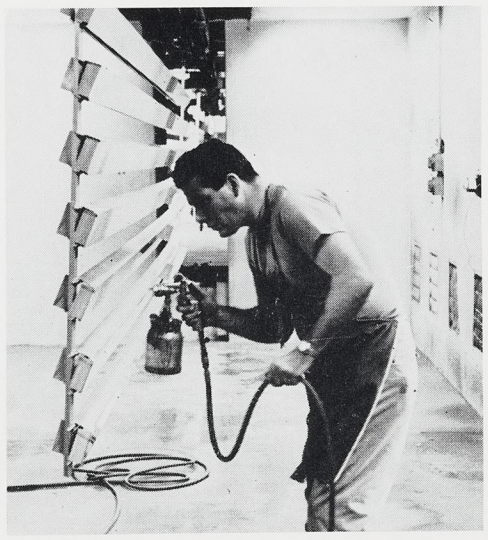


Two-piece aluminum extrusion sample in hands of Bob Eastin, design engineer, typifies complexity of materials used in erection of non-bearing walls.

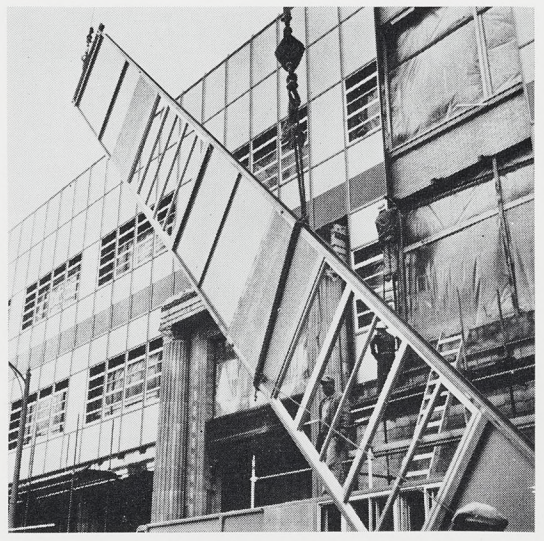
Metal and glass portions of Engineering and Science Center walls were major effort of Long Beach firm in 1957, before they joined Northrop family in 1961.



Curtainwall assembly in plant requires processing of 25 and 30 foot lengths of aluminum and steel. Here 25-foot structure is immersed in wash tank. Next bath will be in chemical conversion coating tank, and by two rinses.



Environment-resistant enamel helps protect extruded aluminum lengths. When Tony Arredondo finishes, material will move into 33-foot oven.



Renovation of older building at lower cost than otherwise possible is accomplished by application of preassembled curtainwall. Installation crew is PAC/WALL's.

New Division Chiefs Join AFPR Staff

Two new divisional chiefs have joined Northrop Corporation Air Force Plant Representative (AFPR) office headquartered at Hawthorne.

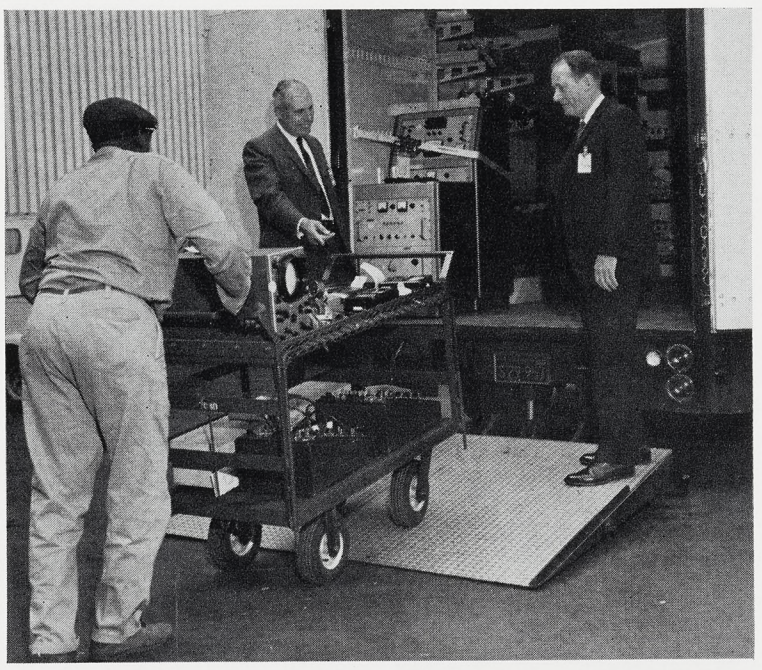
Major Howard D. Clarke assumed duties as chief of the Developmental Engineering Division and James E. Hill became chief of Contract Administration.

Mr. Hill replaces Maxwell G. Pellerin who retired from government service after a long career, including the past eight years at Northrop. Major Clarke replaces Major J. A. Dean jr. who is retiring from active military duty.

Among the departing mementos presented Mr. Pellerin was one outlining his association with Northrop penned by his Northrop friends. One noted his long service, competent representation of the Air Force, and his help and guidance in all contractual matters.

Major Clarke is a veteran of 17 years in the Air Force who has served for the past five years at the Space Systems Division, most recently as assistant director for Gemini B.

Mr. Hill comes to his new assignment from the AFPR office at Lockheed Burbank where he was responsible for contract administration from 1952. Between 1944 and 1951 he also served at Lockheed prior to spending a year as manager of contracts for an Arizona aircraft firm.



HANDLED OH SO EASILY—Bob Catlin (left), Norair manager of Quality Control, shows Larry Knight, NSL chief of Quality Control, how easily driver Jim Westly loads precision measurement and test equipment into new transportation van. Note secured load inside van which handles average of 825 pieces between use points and Standards and Calibration Laboratory.

'Kangaroo' Does Trick For Metrology Hops

While some aspire to a tiger in the tank, Northrop Norair has selected a more docile animal—the mother kangaroo—as a pattern for one of its latest innovations.

This is a motorized van, a sort of mobile kangaroo, which provides the comfort, safety and protection afforded young kangaroos in their mother's pouch.

Norair's innovation, however, is used in moving some 18,800 pieces of delicate electronic and mechanical precision measurement and test equipment between points of utilization and calibration throughout the division and Northrop Space Laboratories.

Distance involved may be only a few hundred yards or many miles.

Regardless, equipment carried is treated as what it most often is—delicate and costly instruments of a highly sensitive nature, easily damaged and subject to loss of calibration.

Quality Control's Standards and Calibration Laboratory drew up the specifications for the enclosed van and recently took delivery from the builder.

The van measures 21 feet long and eight feet wide. It has a custom hydraulic lift, special springs and shocks and oversized balloon tires of the low profile type. Its interior features adjustable padded shelves or racks and a multitude of toggle clamps with which to secure rack-mounted instruments of any size. It also boasts its own special cart for handling smaller loads and moving items from cribs or vans.

Despite its ability to handle delicate loads, the van is made to perform on highways and makes runs once each week to Norair's Antelope Valley facilities and was pressed into service recently for a special load for the U.S. Navy's Point Mugu installation.

Bob Catlin, Norair manager of Quality Control, calls the new van an "answer to a long-time need at Norair" and estimates it will result in savings of over $6100 in its first year of operation.

Art Ohlemacher, general supervisor of the Standards and Calibration Laboratory, notes the new equipment is helping "streamline calibration and repair handling procedures with its handling of an average of 825 pieces of equipment each week."

TOUR SERVICE PLANS FREE TRIP FOR LUCKY HAWAIIAN TRAVELER

There will be one free trip to "alohaland" for some lucky participant taking part in the year-end NRC-sponsored group excursion to Hawaii.

Surl Kim of the tour service booking the trip will award one free trip to some lucky participant signed for the excursion. A drawing will be held the first week in December.

Meanwhile, a group meeting for all interested in the trip will be held at 7:30 p.m. September 22 at the NRC Clubhouse, Hawthorne. Mr. Kim will be on hand to show movies and answer questions.

This year's venture departs December 24 and returns January 2. It will include visits to Kauai, Hawaii, Maui and Oahu islands. An assortment of entertainment and side trips is included.

The cost is $378 per person and includes jet air fare, transportation, lodgings, some meals and sightseeing.

Information is available through Personnel Activities offices throughout Northrop.

Ice Follies Ticket Discount Offered

Arrangements through which Northrop employees may procure discount tickets for Ice Follies of 1966 productions have been made by NRC.

The Follies will be staged September 9 through 23 at the Los Angeles Sports Arena and September 24 through October 3 at the Long Beach Arena.

Special order envelopes may be obtained through all Personnel Activities or NRC offices and other outlets.

AL KIEFER WORKS HARD AND—

Jenny Flies All Out—But Autos Still Pass Her

Al Kiefer is a study in paradox.

He lives in a world of manned spacecraft orbiting the earth at many times the speed of sound and jet transports that race the sun. His work brings him into daily contact with supersonic jets.

Mr. Kiefer

Yet Al Kiefer likes nothing more than a chance to talk about the 23 hours he has logged flying a vintage aircraft that can not match the speed of mere automobiles on freeways below him, an aircraft that has thrice let him down, once ending nosedown in a pile of wreckage in an open field.

Still Al Kiefer is a contented man, doing just what he has dreamed of doing for years.

The fact he can even fly his 1918 Curtiss JN4-D Jenny with only four instruments, a top speed of 62 mph and a range of 150 miles is almost as remarkable as his part in its restoration.

The Jenny is a lady with a past, the first airplane mass produced in this country. She was a prime trainer for World War I aviators and once a very common sight. Her later exploits with barnstorming pilots and aerial stuntmen made her well known. But by the late 1930's she was a thing of the past, seen only in museums.

At present Al Kiefer's JN4-D is the only known Jenny capable of flight.

Al, a staff assistant in Northrop Norair's Materiel operations, and a partner, R. T. (Doc) Hood, former Northrop Nortronics engineer, pooled their resources and talents in 1957 and set about what appeared then to be an impossible task — the complete restoration of a Jenny.

They acquired a quantity of parts and went to many sources seeking others. Aviation historians were willing helpers.

For instance, one remembered that in 1938 he had seen a Jenny in a vineyard barn in the vicinity of Fresno. But that was about all he recalled. Al and Doc started a long and systematic search, picking up bits of information here and there. They finally located the object of their quest and bought a flock of parts from the owner who then lived in Illinois. This was only the beginning. There were other quests in burned out buildings, trash heaps, buried under mud piles, etc. And there was a parallel search for any type of drawing or information available.

Each incoming piece was carefully cleaned and restored. Then came the long and difficult task of putting all the pieces together and fabricating new parts and pieces where original ones were missing.

By 1960 Jenny began to look more like an airplane and by 1962 she was together completely. Al and Doc had spent more than 2000 hours each in restoration work, exclusive of time spent in research and search.

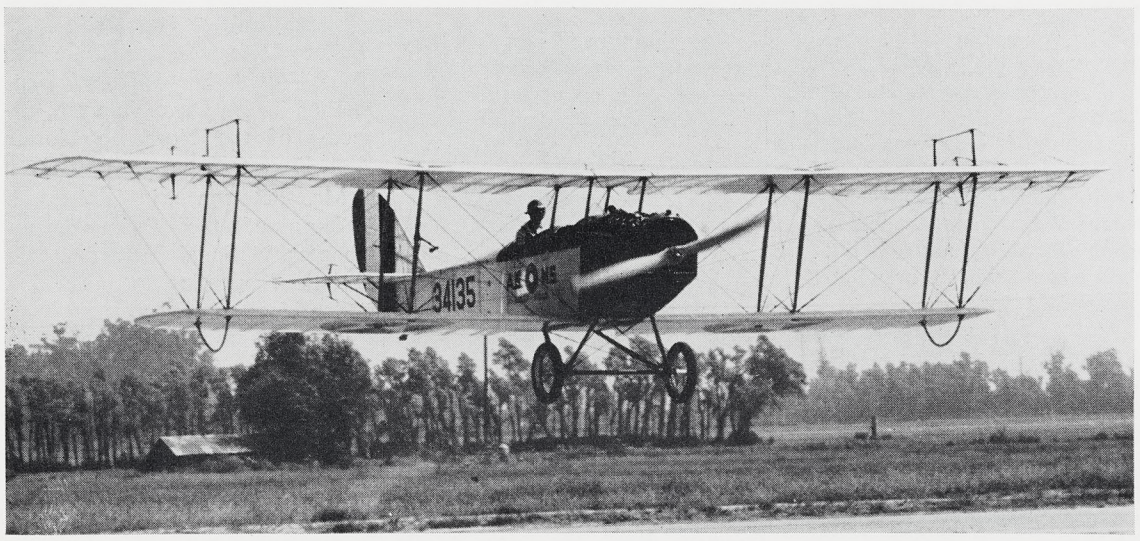
"We had found that the man, Mark Campbell, who inspected our Jenny at the Curtiss plant in 1918 was working for Lockheed," Al said. "We got him to help with our inspection routine, a task he performed with pleasure and vigor, although some four decades separated his work on the plane."

Al had flown some in "unlogged" situations earlier, but now set about getting his license. Doc still does not have his, although he plans to get one so that he, too, can fly the Jenny.

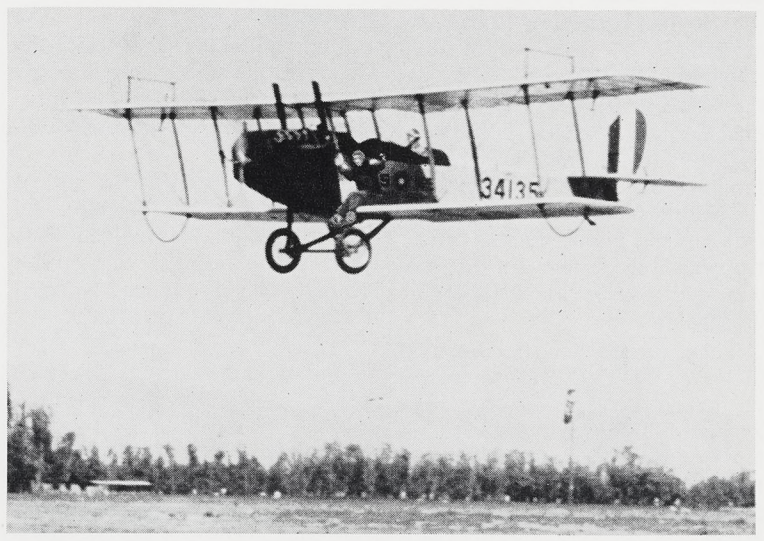
Following FAA certification, Al Kiefer took the restored Jenny aloft for her second "maiden" hop. But a few months later, in late 1963, he was forced to crash-land her in a field near Ontario. Much of the restoration had to be repeated, although a quantity of extra parts were now on hand.

Now based at the Ontario International Airport, the Jenny is an active part of an aerial museum and is taken to air shows in the Los Angeles area. She is a pampered and sought-after lady

(See JENNY, page 4)



Al Kiefer Lands Restored 1918 Curtiss Jenny



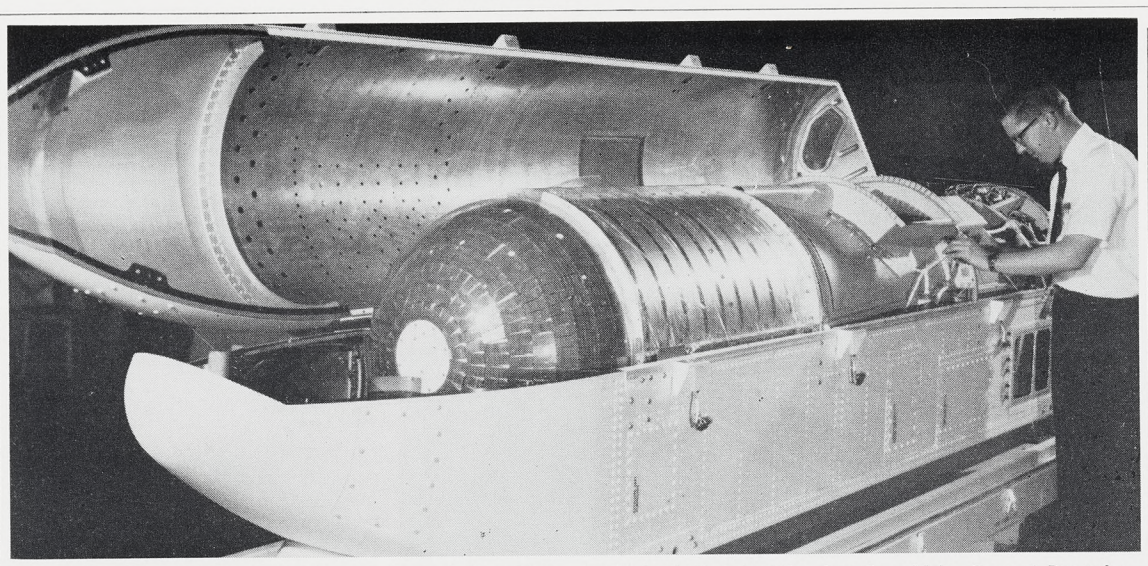
Bob Hannum Waves from Wing

Radiation Belt Payload Set For Launch

A Northrop payload is scheduled for orbit this month in the inner Van Allen belt as part of an Air Force program to investigate the requirements for protection of man against radiation hazards in space.

According to Mac Chapman, project scientist, the Flight Experiment Sub-satellite (FESS) will be the first Northrop payload placed in orbit. If the present schedule holds, FESS will precede the OV2-1 satellite (developed and built by NSL) into space by two weeks. The satellite carrying the FESS payload is the OV1 vehicle (built by General Dynamics Convair), and will be launched by an Atlas booster from Vandenberg Air Force Base, California. The satellite will be the prime payload on a refurbished Atlas. Both the OV1 vehicle and the Atlas launch vehicle are furnished by the Office of Aerospace Research (OAR).

The FESS experiment was initiated by the Aerospace Medical Research Laboratory (AMRL), WPAFB, as a piggyback or bonus payload in the OV1 satellite program. The satellite, also called the ARS, is in the OV (orbiting vehicle) series and is designated OV1-2. The FESS program is currently being directed by the Biophysics group at the Air Force Weapons Laboratory (AFWL), Albuquerque, New Mexico.



READIED FOR LAUNCH—Technician at General Dynamics Convair, San Diego, inspects completed package for September launch of FESS biosatellite. Propulsion module has been mated with satellite and placed in the pod which will be bolted to Atlas launch vehicle. General Dynamics provided pod and propulsion module, while Northrop developed instrument package designed to obtain data on radiation doses in space.

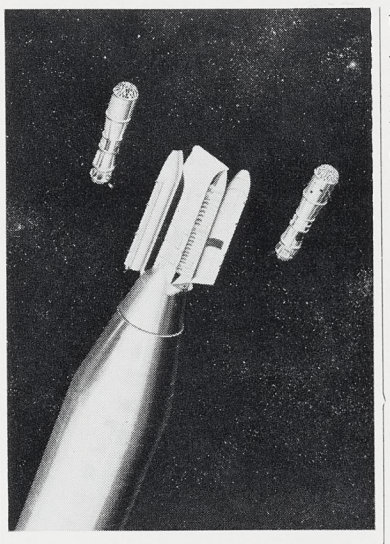
Dr. T. A. Farley of UCLA's Institute of Geophysics, consultant to Northrop Space Laboratories on FESS program, reviews instrument design data with M. C. Chapman, project scientist.

Primary purpose of the Northrop payload is to obtain experimental data on radiation doses in space in support of computer analyses of radiation shielding. A theoretical computer program to calculate radiation exposure has already been developed by NSL.

As an important phase of the Air Force's biological testing, the experiment includes:

1. Evaluation of current computer programs to predict radiation doses inside space vehicles, including assessment of the importance of radiation anisotropy and energy spectra to radiation shielding calculations, conditions that are most difficult to simulate in a ground laboratory;
2. Measurement of electron, proton, and X-ray dosages in materials (including tissue-equivalent material);
3. Gathering of geophysical data, including measurement of the energy and spatial distribution of particles trapped in the Earth's magnetic field (Van Allen zones).

Complementing the NSL experiments will be two government-furnished experiments, one each from Air Force Weapons Laboratory and Aerospace Corporation.



Sketch shows how FESS will be injected into space from atop Atlas booster. Propulsion modules of satellite will fire the payload into a predetermined orbit.

The satellite will be orbited at an inclination of 35 degrees, with perigee of 236 nautical miles and apogee 1836 nautical miles. Over the experiment lifetime of 6 months, greater than 100 million pieces of data will be returned to earth for analysis.

The material distribution of the vehicle was experimentally determined, and these data in conjunction with simultaneous geophysical and dosimetric data will permit assessment of the importance of radiation anisotropy, energy spectrum, and vehicle material distribution to calculations of proton depth-dose distribution, bremsstrahlung dose, and total tissue dose. A separate contract for analysis of data obtained by the instrument package has been awarded to NSL, Mr. Chapman added.

The experiment is unique in that, to date, no space experiment has been performed to establish a confidence level to be associated with analytical methods of calculating radiation dose in space.

The NSL Physical Sciences section, Nuclear Sciences Laboratory, was responsible for all the scientific aspects of the program including design and calibration of the instruments, while the Systems department was responsible for instrument development and testing. R. W. Bratt served as project manager.

Dr. T. A. Farley and C. R. Benjamin, consultants from the Institute of Geophysics, UCLA, contributed unique techniques in the design of the partical spectrometers, based on phoswich (scintillation) phenomena. Dr. Farley will also participate in the analysis of the geophysical data.

CLAY RECALLS VJ DAY

Tice Was First in Japan After Cease-Fire

While Americans commemorate the World War II victory over Japan each September 2, Northrop's Clay Tice observes a personal VJ Day a week earlier.

Mr. Tice

Colonel Tice (USAF, retired), an executive with Northrop International, was the first American to land in Japan after hostilities ceased.

It was August 25, 1945, and the colonel, then a lieutenant colonel and commander of the 49th Fighter Group, was leading the group on a sweep around Kyushu, the southernmost Japanese island. One of the pilots, Flight Officer Douglas Hall, reported a fuel system malfunction and a shortage of gasoline.

They turned for the base at Okinawa but F/O Hall was using up fuel so fast it became apparent he couldn't make it. Despite rumors of resistance from the Japanese it was either ditch at sea, a dangerous maneuver, or land in Japan.

Col. Tice and F/O Hall both dropped their single 1000-pound bombs at sea and headed for a fighter base airstrip at Nittagahara on the east central plain of Kyushu.

"I buzzed the field several times," Col. Tice said, "to test for ground fire. There were planes parked along the strip but the base appeared deserted."

Col. Tice set his plane down first. He let it roll to the end of the strip and turned it around fast to take off down wind if necessary.

The remaining 10 planes of the 49th were buzzing overhead ready to provide cover fire if the Japanese opened up on the landed P-38.

Col. Tice waited at the end of the strip about five minutes. All was still quiet. He radioed F/O Hall to land and the young pilot brought his plane in and wheeled it around beside Col. Tice's.

"There was a Japanese Tony fighter parked nearby," Col. Tice recalls, "and I thought maybe I could fly it back to Okinawa and let Hall take my plane."

There was still no sign of life around the strip as the pair went over and examined the Japanese fighter.

"It was no go," Col. Tice said. "I found out later you need an external starting unit for the Tony."

The P-38s still in the air were running low on gas and the colonel had to decide quickly what to do.

"I went back to my plane and radioed to ask if there were any air-sea rescue planes in the area." A B-17 off the east coast of Japan piloted by Lt. Edward Hawkins intercepted the message.

"I knew the field would be a tight squeeze for a '17 but I asked the pilot if he could land and give us some gas. Lt. Hawkins said he could and asked for the location.

"Our other '38s were forced to leave before the B-17 reached us and it got mighty lonesome down there. We were sure there were some Japanese around but we didn't know where, or what they planned to do."

Col. Tice's suspicions proved correct. Only minutes later three Japanese officers appeared walking toward the two pilots and their planes.

"Hall and I were naturally apprehensive, but as they got closer we were relieved to see that they were unarmed except for their swords. They halted about 10 feet

(See TICE, page 5)

JENNY

(Continued from page 3)

now. And she has won a flock of prizes.

Al's longest flight was some 78 miles and a real experience.

"We have no compass and I fly with a wingman or by watching landmarks," Al says. "And while I love every minute of it, it is work, real hard work."

In addition to their desire to restore an aviation great, the partners also like to re-create situations as they were in the Jenny's heyday.

Bob Hannum of Norair's Quality Control was a recent participant in such an endeavor.

"Bob is a former sky diver and stuntman and very graciously consented to helping me re-create the feel of handling Jenny with a man on the wing," Al says. "We took off and he climbed out and took a perch on the leading edge of the wing, gaily waving to astonished spectators below."

Bob and Al now have a better feel for what the old barnstormers experienced in yesteryears.

Right now Al has another objective in sight — a real cross-country flight. He wants to fly, in Jenny, all the way from Ontario to San Juan Capistrano.

Underwater Radio Tests Successful

Experiments conducted in the waters off San Francisco Bay by engineers of Astro Technology Corporation of Palo Alto, Calif., a subsidiary of Northrop Page Communications, may lead to important advances in underseas radio communications.

As the result of recent experiments, Astro Technology engineers believe a high-frequency underwater communications system may be feasible for use in oceanographic and anti-submarine warfare programs.

According to Engineer Norman C. MacLeod, Astro Tech has not only sent audio and video signals over distances previously considered impossible, it has sent them at much higher frequencies than was previously thought possible.

Working from fishing boats outside the mouth of San Francisco Bay, a 250-watt transmitter was used to drive an antenna which was lowered to a depth of about 250 feet. Using a 20-foot dipole antenna and a frequency of seven megacycles, the men established communications over a distance of about 1500 feet.

Signal range has been shown to have a direct relationship to antenna length, indicating that range can be increased by extending the baseline of the antenna, Mr. MacLeod said.

Teachers Will Be Nortronics Guests On Education Day

Northrop Nortronics (Anaheim) is again mapping plans for participating in an area-wide Industry-Education Day set for September 10 in Anaheim.

This annual event makes it possible for teachers in public schools in the area to visit local industrial firms, to learn something of their business operations, plans, and products. These teachers, in turn, may use the material in teaching their classes during upcoming school terms.

Nortronics (Anaheim) has been a participant in this program for a number of years, playing host to educators from the area.

Each visit lasts for about four hours and includes briefings by top Nortronics officials, a luncheon and a tour of factory and assembly areas.

Secretaries Pick Petersen to Speak

Some timely comments on a timeless topic—"The Philosophy of Zero Defects in the Home and Office"—will be delivered September 21 by Dave Petersen, director of the Northrop Norair Zero Defects Program.

Mr. Petersen will address a meeting of the Twin Harbor Chapter, National Secretaries Association, meeting at the San Pedro Hacienda.

All Northrop secretaries and their guests are invited to take part. The dinner meeting begins at 6:30 p.m.

Reservations will be accepted until September 17 with Rita Harris, ext. 2436 at Norair, the reservationist.

Total cost, including dinner, is $2.75 per person.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Bicycle, 10-spd. French racing-type, never used, $60. PV Pen., FR 7-5075. A

Bicycle, 10-spd. racing-type, $35. Anaheim, 776-9598. A

Gladiron, 24" Thor, $15. L.A., 645-3986. A

Washer, Kenmore, automatic, $100. Hawthorne, OS 5-1057. A

Bar, w/4 stools, Hong Kong made solid rattan, $90. PV, 377-6222. A

Archery Equip., custom bow, 45 lbs., w/case, $8. Culver City, VE 9-5438. A

House, 3-bdrm, 2-bath, built-ins, pvt. atrium, nr. schools, beaches, $31,900. Torrance, FR 8-1350. A

Corvette, 1964 fast back, 365 hp, r/h, new tires, 4-spd., $3500. Hollywood, OL 6-3475.

Typewriter, portable Remington, case, $10. Los Alamitos, GE 1-4233. A

Movie Camera, 16mm, mag. ld., Revere turret lens, projector, 16mm Keystone, screen, $100. Box 1501. A

Home, Hollypark, fireplace, 3-bdrm, 1¾ bath. C & D booth in kitchen, early American int., $26,900. Gardena, DA 9-3767. A

Buick, 1954 conv., p/s, p/b, $175. Canoga Pk., 341-3525. A

Fiat, 1960, 1200 series, 4-dr., good tires, $295. Torrance, FR 5-9946. A

Chain Hoist, ½-ton, $20. Inglewood, OR 1-2058. A

Jaguar, 1960 3.8 sedan, 4-dr., p/s, p/b, Becker FM-AM, auto. trans., $1450. El Segundo, 322-5207. A

Bedroom Set, maple, twin beds, mattresses & box springs, dresser w/mirror, $35. Box 1502. A

Cooler, rm.-size, evaporation-type w/stand, McGraw Edison, $32.50. P.V. Pen., 377-3806.

Bedroom Set, twin beds, 9-drwr. dresser, 2 lamps, nite stand, $50. Gardena, 679-1642. A

House, 2-bdrm., 1-bath, lge. patio, lot 50x150, fenced backyard, landscaped, alum. siding, $22,000. Hawthorne, 672-5798. A

Range, gas, Wedgewood-Holly, 1963, sep. oven & broiler burners, hood, fan, rotisserie, yellow, 42" wide, $145. Garden Grove, 537-6760. A

Pool Table, boy's, 5'x3½', live cushions, $25. Hawthorne, OS 5-0645. A

Pistol, Ruger .22 cal., 4½" barrel, 9-shot auto., $32.50. Torrance, 328-5655. A

Dodge, 1957 4-dr. h/top, conv., V-8, r/h, auto. trans., p/s, p/b, $425. Torrance, 375-9657. A

Dining Table, console-type, walnut, extends to 90", $45. Lomita, 547-2716. A

Vacuum, Kirby, all attachments, $60. Inglewood, OR 2-2564. A

Utility Trailer, good tires, lights, top, $50. Hawthorne, OS 9-3978. A

Jaguar XKE, 1962 conv., low mile, wire wheels, extras, $2895. Garden Grove, 892-3552. A

Plymouth, 1960, 2-dr. 6-cyl., stick shift, $495. South Gate, LO 6-4306. A

TV, 21" AM-FM radio, 3-spd. record player console, blonde, modern, $50. Manhattan Bch., FR 4-8036. A

Chevrolet, 1964, Impala, SS, p/b, p/s, factory air cond., r/h, $2850. Ontario, 714-984-4660. A

Motorcycle, Montesa, Super Impala, 175cc, near new, $450. Redondo Bch., FR 1-1988. A

Telescope, 6" astronomical, excellent mirror, equatorial mount, portable, w/3 eyepieces, $199. Manhattan Bch., 379-4775. A

House Trailer, 27' Peerless, tandem wheels, new tires, insulated & furn., $650. Hawthorne, 676-1471. A

Stove, Imperial, 4 burner & oven, clock, timer, $20. Manhattan Bch., FR 4-8608. A

Mercury, 1953 h/top, 1956 Cad. eng. & race Hydro, new shocks & brakes, $350. Torrance, DA 9-6174. A

Washer, Philco automatic, $35. Torrance, 371-1086. A

Ski Boat, 15' fiberglass, Anthony Jetstar w/70 hp Mercury & trailer, $950. Torrance, 370-4778. A

Chevrolet, panel truck, 1954, r/h, new paint, good tires & brakes, $245. Wilmington, TE 4-0362. A

Oldsmobile, Starfire, 1958, conv., p/b, new battery, deluxe radio, $850. W. Covina, PL 6-2587. A

Apts, 1-yr-old, 4 units, 2 & 3 bdrms., disposals, built-ins & car ports, $45,000. Inglewood, OR 7-8797. A

MGTD, 1953, 1500 miles, reblt. eng. & clutch, good tires, new paint & top, $425. Redondo Bch., 375-1396. A

Carpet, w/pad, 14'x16½', $100. Inglewood, 673-0306. A

Ski Boat, 18' w/trailer, Chrysler eng., extras, $3000. Norwalk, UN 5-8863. A

Coffee Table, mahogany, $10. Torrance, FA 8-4243. A

For Sale

Typewriter, manual, Underwood, w/stand, $15. Gardena, DA 9-7447. A

Corvette, 1964, 300 hp eng., 4-spd., 2 tops, AM/FM, $3200. Anaheim, 776-4969. A

Refrigerator, Servel, 18 cu. ft., 2-dr., 70 lb. freezer cap., shelves in door, $75. Torrance, DA 6-5663. A

Dodge, 1961, auto. trans., heater, big eng., $600. Inglewood, OR 8-0250. A

Honda 90, 1964, black, $260. Inglewood, 677-4048. A

Jig Saw, Craftsman, 18" w/steel power tool table & walker turner, ⅓ hp ball bearing motor, $55. Huntington Pk., 589-9503. A

Dodge, 1956, 4-dr., r/h, new seat covers, $300. Torrance, FR 1-1905. A

Cabin Cruiser, 32' Hunter sedan, 115 hp Chrysler Crown, sleeps 6, radio, d/f, autopilot, $6700. San Pedro, TE 3-8903. A

Ford, 1957 conv., 1958 Merc. block, 332 cu. in. Merc. hvy. duty trans., auto., 411 rear end, $500. Torrance, 370-4101. A

Tenor Sax, Buescher, gold, $125. Manhattan Bch., FR 4-6003. A

Blonder-Tongue, BCT99 UHF converter for channels 14 to 83, $12. P. V. Ests., FR 5-0867. A

VW, sunroof, 1962, good tries, 1965 eng., many extras, $1050. Torrance, 323-1698. A

Hide-A-Bed, Simmons, brown & gold thread, $85. Hawthorne, OS 6-8842. A

Volkswagen, 1957, new sunroof & paint, r/h, good tires, $750. Anaheim, 714-897-9075. A

Bedroom Set, twin beds, dresser, hampstand, mattresses, $75. Inglewood, 678-3318.

House, 2-bdrm. on R-2 lot, $16,000. Torrance, FR 1-0629. A

Malibu Super Sport, 1965, 327 eng., 4-spd. Muncie, h/d suspension, $2585. Gardena, 631-6763. A

Dresser, hi-boy & night stand, antique white w/gold trim, $25. Orange, 637-0013. A

House, 1 mile to Research Park, 4-bdrm., family rm., 2 baths, all built-ins, patio, fenced & landscaped yard, $41,900. P. V. Pen., PL 7-5181. A

Home, 3-bdrm., 1¾ bath, new water heater, patio, block fence, 2-car gar. w/650 cu. ft. storage area, $26,500. Gardena, DA 3-0379.

Travel Trailer, 16' Jewel, elec. brakes, sleeps 5, $795. Fullerton, LA 5-6595. A

House, 3-bdrm, split-level, built-ins, 1½ baths, dble. garage, $22,500 or rent. Redondo Bch., 374-2433. A

House Trailer, 28', comp. furn., $300. Inglewood, OR 7-0993. A

Lot, approx. 1/3 acre, at Golden Shores in Ariz. along Colorado River, near boat landing, streets in, $500 dn., $29 mo., $2000. Burbank, 845-3363. A

Boat, 15' Glaspar, 35 hp Evinrude, conv. top, elec. starter & many extras, $695. Redondo Bch., FR 8-2609. A

Ford Galaxie 500, 1964 conv., 300 hp T-Bird eng., r/h, p/s, about 15,000 miles, $2195. Thousand Oaks, 495-6055. A

Ford Country Squire, 1955, r/h, $250. Manhattan Bch., FR 4-5028. A

Air Cooler, 26"x17"x18", water circulating-type, 3-spds., used once, $50. Rolling Hills Ests., FR 5-8778. A

Organ, Baldwin model 40, Orga-Sonic, percussion added, Philippine mahogany w/matching bench, $695. Redondo Bch., FR 5-3914.

Minnie Bike, 1965 model, Taquito, $110. Long Bch., 424-5992. A

Chair Set, med. wing back, white brocade, 1-yr-old, $50. L.A., 670-8926. A

SCUBA diving gear, single 71 cu. ft. tank, dble. hose regulator w/reserve, ⅛" full wet suits, $40. Long Bch., 439-4618. A

Chevrolet, 1956 4-dr., V-8, auto. trans., avail. Sept. 27, $350. Box 1503. A

Sunbeam Alpine, 1962, wire wheels, good top & paint, $1150. Compton, 327-8226. A

Studebaker, Power Hawk, 1956, 4-barrel carb., p/s, p/b, new Gabriel shocks, r/h, auto. trans., $295. Hawthorne, OS 6-3388. A

Stereo Hi-Fi Components, AM/FM tuner, dual amplifier & preamps, 4 speakers, turntable, $66. Hawthorne, 676-0418. A

Austin Healey, 1955, ISKI racing cams, $795. P. V. Ests., FR 5-4294. A

Vacuum Cleaner, Eureka Empress, 3-mos-old, carrying case for all attachments, $90. Culver City, 836-4934. A

Home, 2 blks. to beach & stores, knotty cedar paneled, built-ins, completely redec., partially furn., patio & sundeck, redwood fence, fireplace, 2-bdrm., bath, 20' Owens w/75 hp Evinrude inc., $32,000; extra bedroom & bath added for $34,000. P. V., 377-8259. A

Surfboard, 8'11" Bing, $75. Manhattan Bch., 372-6603. A

Mattress & box spring, matched dble. bed size, Sears Seraform, 2-yrs-old, $35. L.A., EX 8-8805. A

Bicycle, girl's 24" w/basket, $15. Rolling Hills Ests., FR 8-5175. A

House, attached dble. gar., fireplace, beam ceiling, on 2 lots, waterfall & fishponds, fenced, $19,500. Manhattan Bch., 374-5835.

Pontiac, 1964 Catalina conv., r/h, auto. trans., $2495. Santa Monica, 393-7464. A

Acreage, 100 acres, in Lanfair Valley near Colorado River, Joshua trees, potential alfalfa land, near projected Barstow to Needles Fwy., photos on request. $70 acre. L.A., 754-4384. A

Wanted to Buy

Shopsmith, all purpose machine tool. L.A., 478-5440. B

Gun, over & under, .22 mag./20 ga. Hollywood, HO 5-1380. B

Bicycle, ladies', reasonable. Torrance, FR 5-4312. B

FREE (To Be Given Away)

Kittens, 6-wks-old, black & white & grey & white. Inglewood, PL 6-2314. D

Pups, German shepherd, 4 females, 4 males. Box 1504. D

Kittens, pure white, 2 males, 1 female, 7-wks-old. Redondo Bch., FR 5-5310. D

Rentals Offered

Apt, large 3-bdrm, furn. or unfurn., children OK, enclosed gar. avail., close to schools & shopping. $115-$135. Eastview, TE 1-3737. E

Cabins, Lake Gregory & Crestline, sleeps 6, $25 weekends; $60 wk. Venice, EX 1-2040.

Apt, furn. deluxe 2-bdrm, 2 baths, fireplace, free hot water, ground floor, near Norair, $160 mo. Hawthorne, 679-1358. E

Apt, 2-bdrm, 1150 sq. ft., 1¾ baths, pool, rec. room, shuffle board court, furn. & unfurn., $130 mo. & up. Torrance, DA 9-1413.

Bachelor Apt, pvt. beach, 5 minutes from Nortronics Palos Verdes, $85 mo. Portuguese Bend, 377-8444. E

Apt, 1-bdrm., unfurn., lge. closets, pvt. patio, laundry rm., carport, adults, $78.50. Gardena, DA 9-9195. E

Apt, 1-bdrm, deluxe, built-ins & pool, $95 mo. Redondo Bch., 376-2117. E

Apt, 2-bdrm., unfurn., garage, w/light duties, $100 mo. Inglewood, 677-5705. E

Apt, walking distance of Northrop, 2-bdrm., 2-bath, lge. exec.-type, closed gar., $125. Hawthorne, 676-9620. E

Apt, air cond., 1-bdrm., 20 min. to Norair, $95 unfurn., $105 furn. Malibu, 391-7781. E

Apt. 2-bdrm, lge, children OK, walk to Norair, closed play yard w/playground equip., $115 mo. Hawthorne, OS 5-6032. E

Duplex, 1-bdrm, fenced yard, garbage disp., $62.50 mo. Redondo Bch., 376-8545. E

Apt, 2-bdrm, 1½ bath, unfurn., lge. closets, child OK, 2 blocks to Norair, $115 mo. Hawthorne, 679-0622. E

Horse Barn w/4 stalls, ½ acre, hay storage, $50 mo. Long Bch., 433-0685. E

House, 3-bdrm, 1½-bath, lge. living rm. w/fire place, dble. garage, patio, bbq, fenced yard, $150 mo. Gardena, DA 9-6297. E

Apt, 1-bdrm, fully furn., free utilities, pool, $115. Hawthorne, OS 9-7123. E

Studio Apt, 2-bdrm., 2½ baths, deck, subterranean gar., adults, near San Diego Fwy., lease, $175. Inglewood, 373-1143. E

Rentals Wanted

Garage or storage room that could be used for storing tools & furniture in 1000 Oaks or Newbury Park area. Newbury Pk., 805-495-7413, 805-498-3473. F

Personals

Driving to Ohio Sept. 15, will take 1 or 2 riders, share expenses. Torrance, 378-8825.

Pilots wanted for flying club. Low cost flying in well-maintained, well-equipped planes. 2 Cessna 172's, 2 Beech Bonanza's, 1 Meyers 200A, $200 initiation fee & $14 mo. dues. Torrance, 324-2992. L

Share home w/2 working girls, has 2 baths, all-elec. kitchen. L.A., AX 2-6909. L

Leaving for Ohio on Sept. 15, will take 1 or 2 riders to share expenses. Torrance, 378-8825. L

For Sale or Trade

Home, 4-bdrm., 2-bath, in Antelope Valley, corner lot, $12,000 or trade for South Bay or Orange County property. Torrance, 378-5924. M

Acreage, 5 acres, Mojave Desert retreat w/small weekend cabin $3000 or trade for income property. P. V. Pen., 377-6434. M

Boat, 14' Fleetcraft, Mk. 55A outbd., skiis, trailer, $450 or trade for motorcycle or piano. San Pedro, 547-1537. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:30 a.m. — 4:15 p.m.

Crenshaw & Vernon, Los Angeles. Prefer ride with girl. Simona B. Cosme, Norair, ext. 2306, 293-5762. 3

8 a.m. — 4:45 p.m.

Crenshaw & Compton Blvd., Gardena. Martha L. Elliott, Norair, ext. 1712, 679-0882. 5

La Brea & 64th Pl. or Eucalyptus & 64th Pl., Inglewood. Louise T. McCulloch, Norair, ext. 2042, 672-2434. 5

NORTHROP NEWS

Vol. 23 No. 15

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

Special Projects Manager Joe Druliner checks out temperature control system which will be used to apply linear thermoplastic polyester resin.

CURTAINWALL: From an Office To a Major Contractor in 10 Years

(Continued from page 2)

ings of colored porcelain.

Protection of these materials from their environment has been one of the important tasks of the curtainwall construction industry. Currently used painted protective coatings have a life of up to three years before they must be repaired or refinished.

With the high cost of such refinishing in mind, Mr. McFarland had been looking for a coating material that would outperform those in use.

The result of his search is a plastic coating that PAC/WALL expects to guarantee for 10 years in any climate. The new substance is a linear polyester resin powder that is electrostatically sprayed on aluminum or steel and will be available in several colors.

In tests thus far, it has resisted a salt spray for more than 15,000 hours with no visible deterioration. It can expand or contract 1/8 inch per inch or flex around a two-inch mandrel without losing adhesion. It is highly resistant to abrasion or blows, inert to acids at up to 90° F. and has good dielectric qualities.

To prepare metals with this coating or others, PAC/WALL has a new 12,600 square foot finishing plant adjacent to its main building of 30,000 square feet.

The production line for the plastic coating will be fully in operation at the beginning of 1966. The material will be sprayed on in powder form at a temperature of 450° F. plus or minus 3 degrees. The process includes computerized controls, industrial radiometers as temperature sensors, and high intensity quartz lamp heaters developed at Norair's Manufacturing Research and Development by Bob Bridwell, manufacturing research specialist.

PAC/WALL maintains sales offices in San Francisco and Honolulu, and is represented by construction firms in the 11 western states; Alaska, Japan, Norway, France and Spain as well. The company joined Northrop as a two-thirds owned subsidiary in 1961 and became wholly-owned in 1962.

TICE: Former P-38 Pilot Recalls Landing in Japan a Week Early

(Continued from page 4)

from us and saluted smartly. Hall and I returned the salute and the officer in the center stepped forward and timidly extended his hand.

"I realized discretion was definitely the better part of valor at that point and shook hands with him. At this, all three of the Japanese smiled as if greatly relieved."

A small Japanese-English dictionary was produced and Col. Tice got the idea across that a larger plane was bringing in gasoline.

"They pointed out that this wasn't necessary," Col. Tice said. "They had gas. But when I took a whiff of it, it smelled like an old auto race track. It was then I learned the Japanese mixed castor oil with their gasoline."

About that time other soldiers and civilians "started coming out of the woodwork." Curious from the start, they realized that there was no danger of continued American-Japanese conflict — at least in Nittagahara. They arrived on foot and on bicycles. A few were even driving charcoal-burning automobiles.

The B-17 landed a few minutes later and the Japanese lent a hand transferring the fuel. They brought out a truck with a wobble pump and with the P-38 rolled close to the bomber, Japanese soldiers completed the work.

The B-17 crew brought out a case of C rations and gave the goodies to the children gathered around. The Japanese responded with a carton of sugar candy. Lt. Hawkins even started escorted tours of the B-17 interior.

"At this point it was a little difficult to believe that we had been fighting these people just a few days before," Col. Tice continued.

A few minutes later the three planes were able to take off successfully and return to base, concluding an episode like something out of a Hollywood movie script.

Col. Tice has been with Northrop International for 2½ years. He joined Northrop after 22 years in the Air Force.

For 2½ years he was Deputy for Test and Operations at the Air Force Flight Test Center, Edwards AFB. He also commanded the 65th Air Division, Air Defense System, based at Madrid, Spain.

His work with Northrop has taken him to the Middle East, including Saudi Arabia, and to Washington, D.C.

Gemini Five Added to List Of Successes

The record-breaking Gemini Five space flight of Astronauts L. Gordon Cooper and Charles Conrad which ended August 29, also left unbroken the record of successful operation for Northrop Ventura's parachute landing systems.

Beginning with Alan B. Shepard's suborbital Mercury flight on May 5, 1961, Northrop landing systems now have been credited with perfect performance in the recovery of all 10 astronauts who have flown in the nine manned space missions conducted by National Aeronautics and Space Administration.

Throughout the eight-day Gemini Five mission, public attention was focused upon minor difficulties within some spacecraft systems which upon occasion threatened to terminate the flight prematurely.

NASA officials, however, pointed out that the difficulties had been exaggerated and praised the "unsung heroes", the many systems which escaped attention by working perfectly.

"It is a tremendous pleasure," said Dr. George E. Mueller, associate NASA administrator for the Office of Manned Space Flight, "to congratulate the flight crew, the flight operations crew, the program office, the manufacturers, the DOD support, the DOD launch team.

"It was a perfectly wonderful example of men going into space. I think every single member of that broad team deserves a heartfelt thanks."

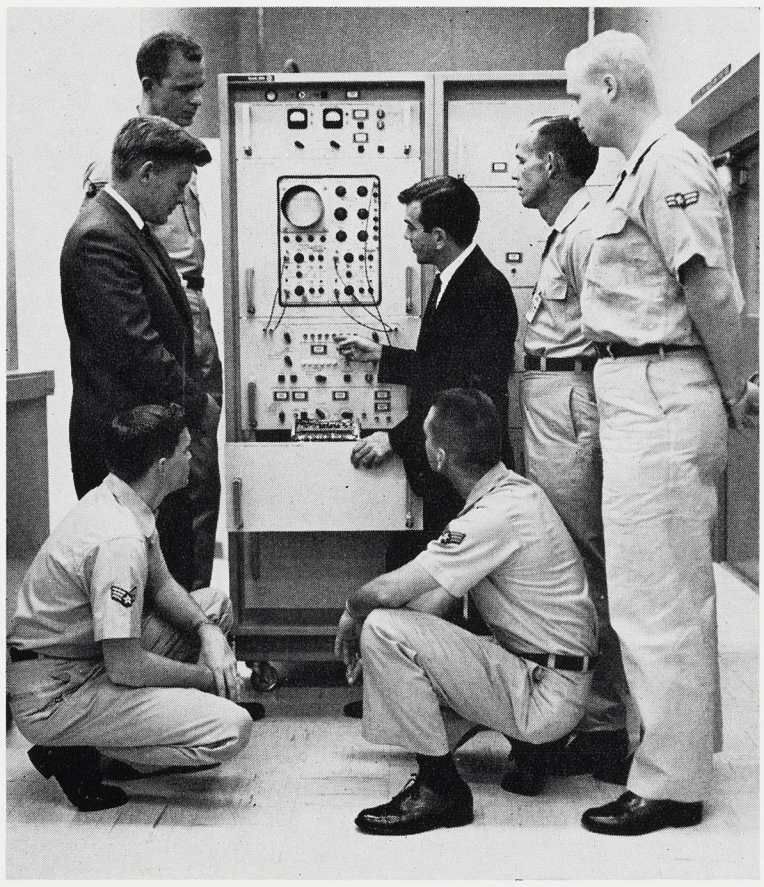
Dr. Robert R. Gilruth, director of NASA's Manned Spacecraft Center, also praised contractors whose equipment worked perfectly.

NRC Golfers Select Jurupa Hills Club

Jurupa Hills Golf and Country Club at Riverside will be the site of a September 11 tournament staged by the Nortronics NRC Golf Club.

Starting times begin at 9:30 a.m. and reservations have been made for 15 foursomes (60 players).

Families of golfers have also been invited to utilize facilities at the Club at nominal rates. Activities include swimming, tether ball, shuffleboard, volleyball, etc.



AIRBORNE COMPUTER STUDENTS—Nortronics (Hawthorne) recently conducted an eight-week course in operation and maintenance of airborne digital computer system for Air Force technicians. Morris Behar (in suit, center) points out working of magnetic memory drum test unit to students including S/SGT. William A. Pollett, A1C Howard E. Robinson, A1C William A. Roland, A1C James R. Barrows, A2C Ronald W. Farley and Marlin H. Forstrom, AF civilian employee.

Nortronics Anaheim Fills Equal Opportunities Role

Another outstanding example of Northrop Corporation's continuing contributions to Equal Opportunities activities is evidenced in efforts centering at Nortronics (Anaheim).

Since early this year Nortronics (Anaheim) has taken an active and leading role in a special program being formulated by Orange County Equal Opportunities Employers. This organization is made up of more than 20 of the largest industrial, business, civic and governmental employers in Orange County.

In May this group sponsored a Job Opportunities Day at Santa Ana Valley High School. Nortronics was one of the firms sponsoring a booth at this event, designed primarily to acquaint minority individuals with job openings, skills, etc. available and required for working in Orange County. More than 1000 individual interviews were performed and Nortronics screened 50 possible applicants interested in employment.

Major emphasis is being placed by the Orange County employers at this time in the field of education. A primary concern is to provide guidance to minority youth with particular emphasis on encouraging them to continue in school for the longest possible time in order to enhance future job opportunities.

One phase of this program will involve a special "career-of-the-month" effort which will send selected representatives of various fields into local schools to talk with youths, inform them of special skills required in careers and various job opportunities.

Elmer Noonan, Nortronics director of Industrial Relations, is chairman of a special committee interested in the parents of minority group students.

This includes the formulation of plans to stage special meetings for parents through church, civic, social and fraternal organizations to provide them with information and help in motivating their children to insure they can compete for, obtain and retain meaningful employment.

At such meetings parents will be provided a wealth of useful information on such subjects as career opportunities, requirements for these careers, the economic security they represent and some idea as to the educational requirements involved. There will also be information on employment agencies, maps showing the location of Equal Opportunity firms, facts on how to be interviewed, job possibilities, and pay scales.

"Much of the preliminary work necessary for carrying out this program has been accomplished," Mr. Noonan said. "We will begin operations on October 16—the kickoff date for the career-of-the-month program in Orange County high schools."

Several Nortronics men have provided special assistance to Mr. Noonan in the program, including Paul Faranda, Personnel administrator; Bill Burch, chief of Employee Relations; and Dick Stuffler, senior Labor Relations representative.

NRC SCHEDULES EXCURSION OCTOBER 10 ABOARD THE STAR

Personnel from Nortronics will board the famed harbor cruise vessel, the Star, October 10 for narrated tours around harbor points of interest.

Two Sunday departures from Pierpoint Landing are scheduled on the 160-passenger boat at 2 p.m. and at 4 p.m., by arrangement of the Northrop Recreation Club.

The Star will visit a graveyard of old ships and Pier J, a 310-acre construction site that is one of the largest such projects undertaken in a quarter century. Passengers will also view a collection of ocean liners, fishing boats, tankers and pleasure craft larger than in most of the world's harbors.

Children under 12 will join the outing as guests of the Recreation Club. Rates for those 12 or older are $1.25.

To reach Pierpoint Landing take the Long Beach Freeway to the harbor area and watch for signs directing to the Landing. Parking will be free.

The ticket deadline is October 6 and Earl V. Bird, president of the Nortronics Recreation Club (Hawthorne and Palos Verdes) indicates that accommodations are limited.

While departure is from Nortronics (Anaheim), arrangements will be made for a stop at Hawthorne, if interest is shown. Make reservations through the Anaheim NRC office, ext. 1092.

NORAID Disbursements Top Half Million Dollars

Over 1850 Northrop Corporation families have received in excess of half a million dollars to help meet personal emergencies beyond their control in the past decade.

Their benefactor: NORAID.

And NORAID, of course, is the thousands of individual employees at Northrop who support this in-plant program together with many community health and welfare agencies through their contributions. A percentage of funds contributed to AID-UNITED GIVERS is returned to Northrop for direct support of the NORAID program.

NORAID is unique in many respects.

First, it is an organization of Northrop people set up exclusively to assist Northrop people— the man or woman at the next workbench or desk. It is administered by Northrop people who give of their time and talents to make it possible.

George Gore, chairman of the NORAID board of directors explains:

"The generosity of Northrop donors, the efforts of those who volunteer their time, and the company's support make it possible for NORAID to disburse all of its funds to maximum advantage — helping those who need it most."

People come to NORAID with all types of problems. They may need help feeding, clothing or housing their families as a result of emergencies. However, the vast majority need help because of medical problems, the temporary loss of income because they cannot work, and high medical costs. There is no average amount for covering these emergencies. It may be a few dollars or it may run into considerable sums.

Above all, those who receive NORAID funds are not permitted to repay. NORAID is an outright gift, not a loan.

Administration of the NORAID program is centered at a single office headed by Marie Tully, Welfare coordinator.

Each major Northrop facility has a NORAID committee made up of employees at that location. At present these committees are headed by Roland Scott at Norair; Harry Belcher at Nortronics Hawthorne and Anaheim; Kelly Burke and L. R. Weltz at Edwards Air Force Base; Tom Post at Palmdale; R. F. Jonas at Cape Kennedy; and A. O. Blithe of a newly-established Huntsville, Alabama group.

NORAID officers are: Paul Wierk, president; Marie Tully, vice president and secretary; and George Forbes, treasurer. E. H. Boren is the NORAID accountant. Members of the board of directors, chaired by Mr. Gore, are Paul Crews, Don Grothe, Ben Trump and R. N. McNamara of Norair; Elmer Noonan of Nortronics; and Mr. Wierk of the Corporate office.

"We are proud to note that during the 12-month period ending July 31 NORAID disbursed $47,488 to help Northrop people," Mr. Gore said. "This brings our total disbursements to $531,346 in the past decade, an outstanding example of how Northrop employees cooperate to help their own."

Switchboard Change

Revised hours for the operation of Nortronics (Anaheim) telephone switchboard are now in effect with operations from 7:30 a.m. to 5:15 p.m.

The same hours are observed by Nortronics switchboards at Palos Verdes and Hawthorne.

PV ARTIST

(Continued from page 1)

five inches long. It's a working model of an English dockyard locomotive that some child must have delighted in when it was a shiny new toy, some time around 1890. Mr. Steinmeyer has collected wind up and electric toy engines as well that would delight any model aficionado.

The smaller trains are part of a collection of pre-World War II tin plate toys. The owner joins other collectors regularly at meetings of the Train Collectors Association, an international group. The more technical aspects of his hobby made him a member of the Los Angeles Live Steamers, which boasts among its members such show business personalities as Walt Disney.

This month, Mr. Steinmeyer will fly to England and Europe, stopping in London to visit the offices of the hobbyist publication, *Model Engineer*. He will detour to the north of England to visit a model train enthusiast pen pal at Durham before going on to the continent.

A Northrop employee for 13 years, the artist worked at Norair before the formation of the Nortronics division.

DDRR

(Continued from page 1)

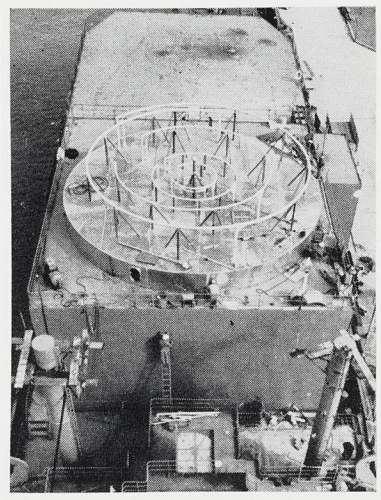
nant Radiator) has also been built small enough (¾ by 2¼ inches) to fit inside an astronaut or aircraft pilot helmet.

The extremely low profile reduces vulnerability to damage and in combat situations is easily camouflaged.

The DDRR was first developed for use on a Ventura target drone. Its performance in that application prompted further development which will continue at the Nortronics Applied Research section.

The DDRR program staff was originally a part of Applied Research at Northrop Ventura prior to the section's transfer this summer to Nortronics Division.

The program was transferred this month because "it is more in line with electromagnetic studies being conducted by the research group," a spokeman said.



Earlier model of DDRR was 35-foot, ring-shaped prototype installed on Pacific Missile Range tracking ship USS Wheeling (above). It is six feet high, 35 feet in diameter and has efficiency of 120-foot tower antenna.

$19 Million Reduction in Costs Reported to DOD

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California Vol. 23, No. 16 September 22, 1965

Army Guests Hear Latest On Software

Northrop Nortronics put its eight years' experience in generating automatic test equipment software on the line this month for a dozen engineers who will direct programming tasks for U.S. Army Missile Command (MICOM) test equipment.

The experts from MICOM, which is headquartered at Redstone Arsenal, Huntsville, Alabama, were joined by a civilian engineer from the Army Electronics Command at Fort Monmouth, New Jersey, for the week long symposium at Anaheim.

Paul Potts was chief host for Nortronics, and six other engineers from the Automation Systems section made presentations during the 40 hours of exchanging data which concluded September 14.

The Anaheim meeting was another in a series for the MICOM engineers, who have participated in a number of other symposiums hosted by defense contractors, in an effort to collect the most comprehensive information available on software support of test equipment.

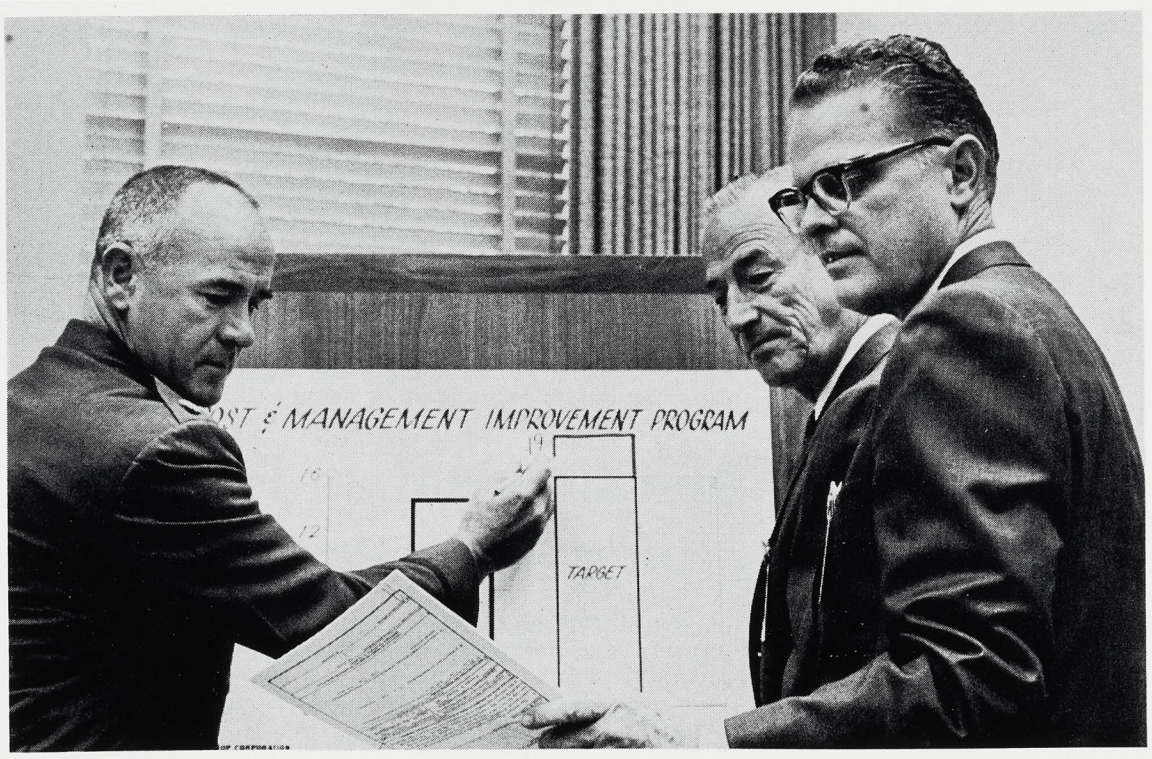
When MICOM selected Nortronics as a symposium leader, it chose a group which is two years ahead of the state-of-the-art in software support, based on findings of a recent analysis by Automation Systems section.

According to Don Miley, chairman of the programming committee for MICOM software programs, the importance of software cannot be overemphasized.

"We have been involved in software development for many years but there has always been something new and helpful brought out at these symposiums."

Participants from Nortronics included Bob Timboe, Jim McCarthy, Stu Novak, Dan Manning, Earl Schappaugh, George Neidhardt, and John Sullivan.

(For a further analysis of software development at Nortronics, turn to page 3 of this edition).



WAY OVER THE TOP—Lieutenant Colonel Rufus K. Keeling (left), Northrop AFPR, marks chart to show Northrop's $19 million savings have exceeded $16 million goal in DOD contractor cost reduction program. Reading off 1965 fiscal year figures are Kenneth W. Hornor (right), Corporate CMIP coordinator, and James M. Hill, AFPR chief of Contract Administration. Savings are 119 percent of year's objective and represent $1300 for each Northrop employee.

CMIP TOPS GOAL FOR FISCAL '65

Continuing its participation in the Department of Defense contractor cost reduction program, Northrop surpassed its $16 million goal for fiscal 1965 with net savings of more than $19 million, Thomas V. Jones, chairman and president, announced this week.

"Our record this year is particularly noteworthy," Mr. Jones said, "in that it resulted from 1343 separate cost improvement actions."

Mr. Jones pointed out also that the total of $19,103,621 in savings equals a cost reduction of $1300 per employee. The amount saved is 119 percent of the year's objective, $16,010,000.

Established in August 1963, Northrop's Cost and Management Improvement Program (CMIP) became part of the DOD nationwide contractors cost reduction effort initiated during 1964.

Savings during 1963 amounted to $22 million, and last year the Corporation logged more than $14 million in cost reduction.

Northrop has also accepted an invitation to join a similar program sponsored by the National Aeronautics and Space Administration.

CMIP is one of the important responsibilities of Richard R. Nolan, senior vice president—Manufacturing and Administration. He shares this responsibility with the general managers of the operating divisions.

Indicative of the importance of this program to the acquisition of

(See CMIP, Page 6)

Northrop's Floating Holidays Scheduled

Northrop's two floating holidays this year will fall on November 26 and December 24, Industrial Relations announced this week.

November 26 is the Friday after Thanksgiving, providing a four-day holiday. The December 24 day off will supplement the yearend holidays.

FOR RETARDED CHILDREN

Even Simple Tasks Are Difficult

When LIFE Magazine hit the newsstands earlier this month with its blue skies story of "superbabies with improved minds and bodies" (*The Control of Life,* September 10), Pete Leibert was watching a young girl with convulsing hands stuff an insert into a newspaper.

Mr. Leibert

To a newcomer it was a pitiful sight, but Pete and the staff members of San Gabriel Valley chapter of the Exceptional Children's Foundation were beaming.

"Six months ago, she was lucky to stuff one stack of papers an hour," Mr. Leibert said. "Now she can do 15 in the same amount of time."

The workshop in which the girl is making progress toward a measure of self sufficiency is one of numerous services for retarded children by the Foundation.

Mr. Leibert, an engineer in Nortronics (Anaheim) Automation Systems section, is a board member of the Los Angeles ECF and president of the San Gabriel chapter.

Headquartered in Whittier, the 200 member San Gabriel Valley Chapter has been operating since 1951. Its sheltered workshop, now three years old, concentrates on youngsters 16 years and older who have the capability of being trained for manual and semi-skilled tasks.

There are now 28 full time students (plus 15 part-time students from the public school system) who are working on competitively bid contracts awarded by businesses and other organizations in the area.

Projects include such jobs as packaging hydraulic caps, making silk screened Christmas cards and putting inserts in newspapers.

"While the students are paid for their work, it is by no means a permanent full-time job for them," Mr. Leibert says. "Workshops are designed for the prime purpose of preparing the children for a meaningful, productive life. Probably the greatest effect of the workshop is the feeling of achievement it gives to the students."

For children under 16, the chapter operates training classes. These help prepare students for special instruction offered by public school systems.

As president of his local chapter, Mr. Leibert does not ordinarily work directly with the children. He's more concerned with administration, logistics, transportation to and from classes for

(See LEIBERT, Page 6)

AID-NORAID Campaign Under Way With Briefing

This week orientation for 400; next week solicitation from almost 13,000.

This is the timetable as Northrop Corporation swings into its 11th annual in-plant AID-NORAID campaign, a once-each-year effort enabling employees to support community health and welfare agencies and fellow employees in adversity through simple weekly payroll deductions.

The campaign began September 20 and ends October 1.

This week 400 volunteers who will carry out the mechanics of the campaign are being briefed at special meetings.

Next week they will contact almost 13,000 employees at Northrop's Corporate office, Northrop Norair functions, all Northrop Nortronics West Coast activities, and employees working at Huntsville, Alabama, and Cape Kennedy, Florida.

Those being contacted will find it very simple to pledge their support to this vital effort, thanks to the introduction of IBM tab cards to the campaign for the first time this year.

For instance, a simple signa-

(See AID, Page 6)

F-5 SQUADRON TO SEE COMBAT IN VIETNAM

Another step toward U.S. Air Force employment of Northrop F-5 Tactical Fighters was taken last week by Secretary of Defense Robert S. McNamara, when he ordered that 12 F-5s be sent to Vietnam.

The purpose of the mission is to obtain in combat more information to be used in developing tactical air concepts, procedures, tactics and techniques for employment of F-5's in combat.

The F-5s will be flown in Vietnam by pilots from the 4503rd Tactical Fighter Squadron who now are in training for the program at Williams Air Force Base, Arizona.

Danger of 'Visual Loading' Overcome With VWS

A warning light glows red on the instrument panel in front of the jet pilot.

He turns quickly toward the light, for the moment ignoring the maze of controls, instruments and indicators surrounding it. The light means he may have to take immediate action, but the pilot doesn't know at first glance what the problem is or what action he will have to take.

It will take the man at the controls about 12 seconds to see the light, decide what to do, and do it. If he is already in an emergency or battle condition, it may take him that long or much longer just to notice the light.

Because of the complex of instruments a pilot must keep track of with his eyes—a panel full of gauges and indicators concerned with flight control, navigation, engine condition, communications and armament—he is in danger of "visual loading," a condition that can slow his reaction to an emergency.

One answer to visual loading is to communicate with the pilot verbally and perhaps advise an immediate solution to an existing problem.

Nortronics Palos Verdes has such a system designed to automatically communicate by voice with the pilot. His response time to voice warning of emergencies

(See VWS, Page 6)

ORDAP Director Earns High German Honors

The Federal Republic of Germany last week awarded to James L. Taylor of Northrop Corporation the Commander's Cross of the Order of Merit in a presentation ceremony at the German Embassy in Washington, D.C. One of the highest awards the government can bestow on foreign citizens for exceptional service to the nation, the Commander's Cross was presented by Minister Dr. Herbert Freiherr Von Stackelberg.

Mr. Taylor is director of Northrop's Organization for Development Assistance Program (ORDAP).

The Foreign Ministry of Germany proposed the award in recognition of Mr. Taylor's leadership and contributions in establishing a German operations research capability in support of Germany's defense planning. Northrop has been under contract to the Federal Republic of Germany for this assistance since 1961 and the program extends until 1966.

Studies performed during the period by the German and American scientists under Mr. Taylor's direction were cited as a major contribution to the joint U.S.-German vertical takeoff and landing (VTOL) aircraft development program.

Concurrently with the study effort, the Northrop group provided training in operations research and systems analysis to the German aerospace scientists and assisted in defining defense system concepts for Germany during the 1970's.

Established by Mr. Taylor in 1960, this program makes available to free world countries Northrop's extensive experience in operations research and systems analysis and the application of management science to problems relating to military planning, national development and industrial operations.

Northrop operations research teams normally are stationed in the host country for a period of two to five years and work under the direction of designated host country agencies and management. The Northrop teams conduct planning research studies and furnish necessary management support concurrently with the training and leadership development of assigned personnel of the host country.

Following Mr. Taylor's return to the U.S. from Germany in August 1964, major effort has been applied to the establishment of Northrop development research assistance programs in support of national development in several countries in Europe, Africa and Latin America.

Secretaries to Host Wives of Bosses

Bosses' wives will be honored by the Airborne Chapter of the National Secretaries Association (International) during their annual fall open meeting and fashion show at the Sheraton Marina Hotel, October 14.

Members of the association and their daughters will model the fall collection of the Polka Dot Shops, with Bernie Sklar, proprietor, coordinating the presentation. An added attraction will be a show of oils from Mrs. Harriette Wagner's Palm Desert Art Gallery featuring autumn subjects.

Proceeds of the meeting will be donated to the NSA Home Trust Fund, Marianne Weltman, Airborne president and a secretary in the Norair Marketing department, reports.

The arrangement committee for the open meeting includes several Northrop women: Miss Weltman; Pat Noble of Manufacturing Research and Development, Norair; Marge Stevens, Corporate Public Relations; and Mattie Lee Sherburne, Flight Operations, Norair.

Reservations may be obtained by contacting Mrs. Noble at Norair, OS 5-4611, extension 1791; Mrs. Stevens, CR 4-8061.

Disneyland Night Open to Northrop

Arrangements have been made for Northrop personnel to participate in the Association of the United States Army Disneyland night Friday, October 22, at the associate rate of $3.75 a person for admission and unlimited use of Disneyland attractions.

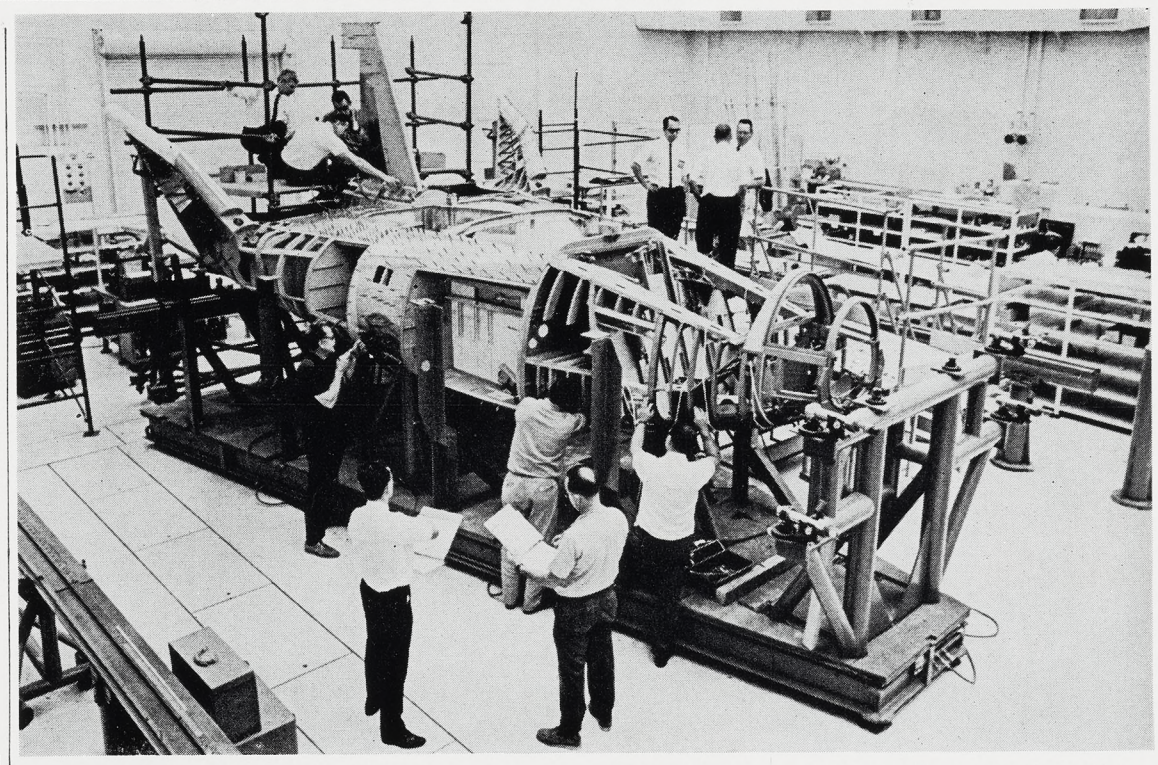
Personnel offices will have AUSA Disneyland tickets available on a first-come basis.

NORTHROP NEWS

Vol. 23 No. 16

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.



RAPIDLY TAKING SHAPE — HL-10 lifting body vehicle is shown approximately half complete at Northrop Norair. Tri-finned vehicle is second of two lifting bodies to be built by Northrop for NASA research program. First vehicle, the M2-F2, was delivered in June and has completed extensive wind tunnel test program.

AFA Convention Features Lifting Body Vehicles

Future applications to space travel, stemming from research with manned wingless lifting bodies, such as those being built by the Northrop Corporation, are featured in a display presentation at the Air Force Association convention in Washington, D. C. this week.

The latest such vehicle, designated HL-10, is being produced for the National Aeronautics and Space Administration by Northrop Norair. Construction of the tri-finned lifting body is on schedule and is approximately half completed. This will be the second such craft to be built for NASA by Northrop this year.

The experimental craft is being constructed in the shape of a half-cone, as was the Northrop-built M2-F2 lifting body delivered to the NASA Flight Research Center, Edwards, California, on June 15 of this year under the same contract. These are the first two all-metal lifting bodies ever built.

The M2-F2 has already undergone full-scale NASA wind tunnel tests, and flights are expected to begin this fall. The vehicles are designed for manned flight within the earth's atmosphere.

"By making maximum utilization of M-2 experience, and using common parts and concepts as far as possible, Northrop has reduced the engineering hours and compressed the manufacturing schedule of the HL-10," L. W. Klauer, project chief of engineering, said during the AFA gathering.

Present research by NASA on half-cone lifting bodies, Mr. Klauer stated, is predicted to lead to such developments as vehicles for space station resupply, space rescue, inspection/interception, command support/observation post and reconnaissance. Both the M2-F2 and the HL-10 will be capable of maneuvering from great altitudes and of landing on selected sites within a 1000-mile lateral range.

In discussing manned lifting body experimental activities, Mr. Klauer pointed out that such programs as the U. S. Air Force SV-5 lifting body shape are anticipated to require vehicles quite similar to the HL-10 and M2-F2. The SV-5 shape has been developed by the Air Force for maneuverable entry mission requirements. A future manned vehicle for subsonic and supersonic flight tests of terminal approach and landing performance is expected to be very similar to the M2-F2 and HL-10 in design and structure.

Another concept developed from these basic designs, described by Mr. Klauer, will be for a lifting body pilot trainer, in anticipation of increasing numbers of this type of vehicle being used in the future.

In addition to producing the HL-10 and M2-F2 vehicles, Northrop is currently completing a six-month NASA contract involving preliminary design feasibility studies of a manned lifting body shuttle vehicle concept. The contract is for basic research, with no vehicle construction involved.

(See LIFTING BODY, Page 5)

MEETINGS

Fourteen From Northrop Have Roles in SAE Forum

Fourteen of Northrop's key engineering and manufacturing personnel will participate in the Society of Automotive Engineers' 1965 Aeronautic and Space Engineering and Manufacturing Meeting next month in Los Angeles.

Jack Mannion and Paul Jacobs of Norair are executive committee members for the two day Manufacturing Forum which gets under way October 4 at the Statler Hilton Hotel. Mr. Jacobs is formerly of Ventura Division.

Bernerd Gaiennie of Manufacturing Research and Development is chairman and organizer of a session on Advanced Techniques for Handling Manufacturing Technical Data, and Arthur F. Eskelin is session secretary. Jud Iler of Norair is co-chairman of a session on Casting Technologies for Advanced Materials.

Presenting papers to the Manufacturing Forum will be Don Rhea (Norair), A. S. Turner (Norair), Alfred P. Langlois (formerly of Northrop Ventura, now assigned to Norair), and William H. Meyer, jr. (Norair).

For the engineering portion of the meeting, October 6, 7 and 8, Jim Brust of Nortronics is chairman of a session on Shock and Vibration.

Dr. Eugene W. Emmerich, Dr. Richard L. Jones and E. D. Jacobs, all of Norair will present a paper on Aircraft Structures. Charles W. Eyres of Norair is chairman of the committee for planning, publicity and promotion.

The Society's reception and banquet will be held at 6:30 on October 6 and the awards luncheon is scheduled for noon, October 7.

* * *

J. Grant Macdonnell Symposium Chairman

J. Grant Macdonnell, Northrop Corporation vice president and controller, will be co-chairman of a panel discussing cost of data during a three-day Data Management Symposium at the Beverly Hilton Hotel, September 28-30.

His military counterpart will be Brigadier General Wendell E. Carter, deputy chief of staff, Comptroller, Air Force Systems Command, Andrews AFB, Maryland.

Mr. Macdonnell, a 23-year Northrop veteran, was named to his present position in July. He was treasurer at Norair prior to his recent appointment.

PROPOSED IN PARIS

Automating Aircraft Ground Support

Aircraft maintenance men of the near future may be able to find specific trouble spots in a matter of seconds by putting on earphones and listening to a tape recording.

This reduction in aircraft turnaround time is one of many improvements to flight readiness and safety for high performance aircraft made possible by a DATICO system developed by Northrop Nortronics Automation Systems section at Anaheim.

The system was described by Burl Ervin in Paris this month at a symposium sponsored by NATO's Advisory Group for Aeronautical Research and Development (AGARD). The paper was co-authored by W. R. Peterson, director of the Automation Systems section.

The integrated systems concept covers all levels of aircraft support: in-flight, flight-line, base and depot. The concept is based on equipment which is either in existence or which is being developed by Northrop to satisfy similar requirements.

The report described a continuation of the total integrated system support concept which Northrop has developed and proven over a period of several years in support of weapon systems such as the Polaris missile.

The concept applies to all checkout and maintenance except such servicing activities as re-fueling and re-arming, Mr. Ervin said.

Speed up of flight line service is intertwined with equipment for in-flight system.

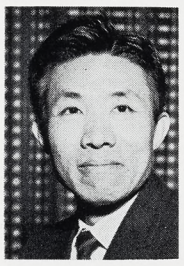
In describing the in-flight checkout function, Mr. Ervin referred to a two-fold mission: (1) Provide information to the pilot as a basis for in-flight action, including all conditions affecting flight safety; and (2) Provide a means of rapid, easily understood notification to the flight line of any post-mission corrective action required.

To service these requirements, Nortronics proposes a voice warning system (VWS) complete with a flight record section and in-

(See AUTOMATION, page 5)

Merit Award Won by NSL's Dr. Steve Hu

Dr. Steve S. Hu, director of Research and Analysis at the Northrop Space Laboratories Huntsville, Alabama facility has received the Northrop Space Laboratories Merit award for outstanding performance.



Dr. Hu

Dr. Hu received the award recently from Roy P. Jackson, vice president and assistant general manager—NSL, at the initial meeting of the new NSL-Huntsville Management Club.

Mr. Jackson pointed out Dr. Hu received the award for his leadership at the NSL-Huntsville facility and the eminence he has achieved as an authority in the field of aero-astrodynamics.

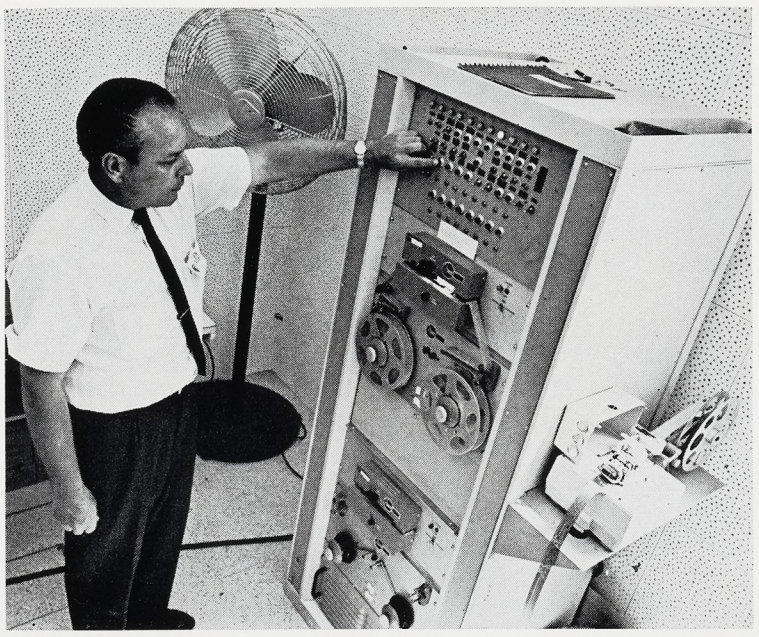
Dr. Hu is also a professor at the University of Alabama and through his dedication and professional excellence has helped to build the NSL-Huntsville Research and Analysis section technical capability from a staff of 13 persons in early 1963 to 118 at present. This group includes men with 18 Ph.D., 32 with M.A. and 51 with B.A. degrees.

Venturans Waltz Through Security Test With Ease

"Thinking About Security", a brief summary of security procedures, was recently published at Northrop Ventura as a means of providing reorientation to cleared employees. It will also be used to supplement the initial security indoctrination given new employees.

C. K. Simmers, division security officer, reports that more than 95 percent of Northrop Ventura employees passed the security test provided in the back of the booklet. "It was gratifying," he added, "that 65 percent of our people achieved a perfect score after reading the material."

Those who were unable to pass the test will have an additional opportunity to do so after further orientation by their supervisors.



TAPE CENTER—Bob Timboe, chief of Tape Center in Northrop Nortronics' Automation Systems Section, operates machine which checks duplicate computer tapes against the master. Tapes are operational instructions for automatic checkout equipment such as the DATICO system developed for U.S. Navy Polaris missile program by the Anaheim facility.

TRAVEL

TRAILERS, CAMPERS WILL GO SOUTH FOR MEXICAN 'FIESTA ON WHEELS'

Northrop owners of campers and trailers will head south over the long Thanksgiving holiday period for an unusual "Fiesta on Wheels" visit to Ensenada, Mexico.

Open to all Northrop families, the event is being sponsored by the NRC Trailer and Camper Club.

Reservations must be made well in advance through Personnel Activities offices at Northrop locations with an October 8 deadline.

At the time of making reservations a registration fee of $23 a vehicle must be paid. This is the total cost of the package visit and includes Mexican insurance, parking, shows, exhibitions, a barbecue, identification badges and souvenir booklet. Several options are open to participants at extra cost. Included are such events as Thanksgiving dinner, a fishing derby, and fashion show.

Dates of the "Fiesta on Wheels" are November 25 through 28.

Specific questions may be directed to NRC at Nortronics (Anaheim), ext. 1092.

* * *

NRC Slates Mexico Trip for Holidays

Through arrangements made by NRC Travel Clubs, a special group tour of Mexico is being planned for the yearend holiday period and is open to all Northrop families.

Plans call for departure December 24 via jet flight and return January 5. Stops will be made in Mexico City, Taxco, Acapulco and nearby points.

Total cost, which also includes many meals, lodging, air fare, etc., is $345 per person.

Arrangements are being handled through the Nortronics (Anaheim) Personnel Activities office, ext. 1092.

* * *

'Hearst Castle' Tour Set By NRC

Another first will be added to popular all-Northrop group tours sponsored by combined NRC effort October 9 and 10 with an initial visit to the famed Hearst Castle at San Simeon.

Plans call for a Hawthorne departure at 9 a.m. on Saturday, October 9, lunch at the Andersen's Split Pea Restaurant at Buellton, a two-hour shopping tour of the Danish village of Solvang and late afternoon check-in at the Golden Tree Lodge, Morro Bay. Dining, dancing and entertainment follows that evening.

The total cost per person is $18.75 and includes all transportation, lodging and tour costs. Meals are not included.

Importance of Software Stressed at Symposium

A week long symposium at Anaheim, prepared and hosted by Northrop Nortronics for U. S. Army Missile Command supervisory personnel has again emphasized that automation hardware is only as good as the software program supporting it.

High on the list of subjects discussed by 12 civilian engineers from the Missile Command, which is headquartered at Redstone Arsenal, Huntsville, Alabama, and engineers from Nortronics Automation Systems section was the Division's Test Oriented Software System (TOSS).

TOSS is at least two years ahead of the state-of-the-art in software support of automatic checkout equipment (ACE), section engineers said.

According to Bob Timboe, head of Automation Systems section's Tape Center at Anaheim, software has grown in five years from 10 percent of the cost of an ACE contract to as much as 50 percent today.

"In fact," he added, "software has become significant enough in automation projects that we are now being awarded contracts separate from the hardware to provide these services."

Loosely defined, software is everything that is necessary to make hardware work. In the case of automatic checkout equipment, the end result is operational test instructions in the form of computer tapes, but before the end product comes such activities as establishment of procedures and programs.

The greatest requirement for software support at Nortronics has been the Polaris missile program for which the Division has provided automatic checkout systems since 1958.

At the inception of the project, there were 12 systems supported, requiring 20 separate computer programs and 280 tapes. Today there are 84 systems supported, requiring 2187 computer programs and 12,000 tapes.

"If we had proceeded under the old system we would have 50 or more people in the Tape Center doing nothing but writing programs," Mr. Timboe said. "Using TOSS techniques we need only 15 and we have the best on-time delivery record in the business."

Nortronics is, in effect, "automating automation," in that the Division is using one computer to write programs for other computers.

Unique to the industry, the technique begins with an engineer describing what the checkout equipment must do. The description is translated into computer language and fed into an IBM 7040. Included in the printout are the procedures which the ACE system must follow.

Not only does it work where others have had their troubles, the technique has cut costs and allowed the Automation Systems section to post a perfect record for on-time deliveries.

Because the program is general rather than confined to a particular system, part of it can be used on numerous projects. Nortronics' own adaptation of computer languages is so simple that an engineer can prepare the preliminary test procedure in the program language.

Basic programs are so written that routine calculations and engineering activities are performed automatically, while anything that is unique about a system is readily identified for an engineer to handle manually.

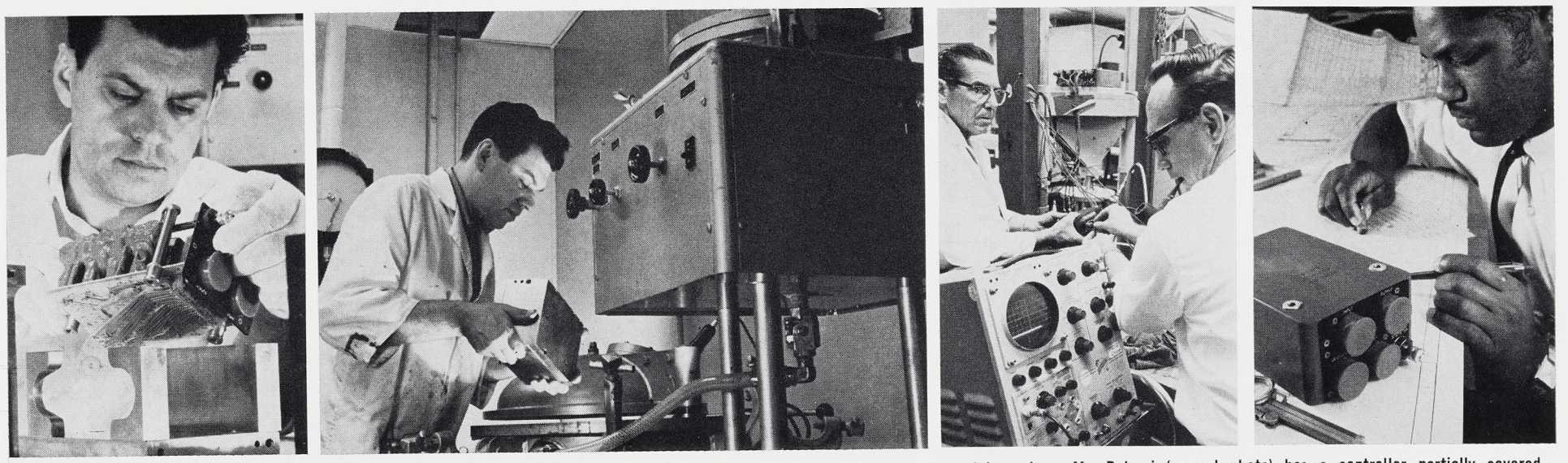
While TOSS is only one aspect of the over-all automatic checkout equipment program, it's early successes have prompted further investment to develop refinements to the system.

Harry Borowka New Chapter President

Harry Borowka of Norair's Perspective Drafting department has been elected president of the Southern California Alumni Association of Delta Phi Epsilon, national professional foreign service fraternity, for 1965-66.

Mr. Borowka, active in the fraternity alumni group since 1957, extended an invitation to Delta Phi Epsilon members at Northrop to contact him for information on alumni activities. He can be reached at Norair extension 1348 or EXbrook 5-5832 evenings.

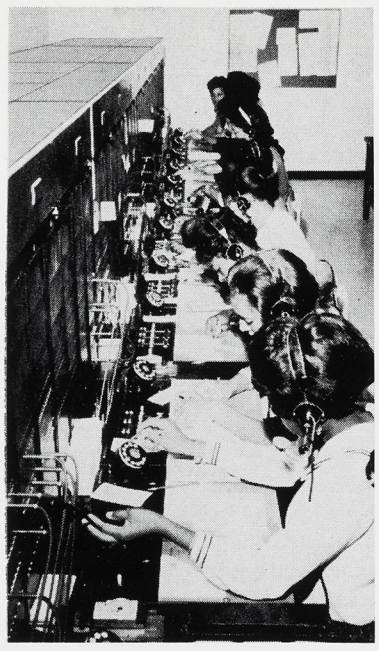
SEQUENCE CONTROLLER FOR APOLLO RECOVERY SYSTEM IS ADVANCEMENT OF STATE-OF-THE-ART



Sequence controller, which weighs only 6.25 pounds, was developed last year by Northrop Ventura as electronic brain of Apollo spacecraft recovery system. To meet reliability goals established by NASA, the Division developed an encapsulating technique, known as potting, which involves pouring a liquid chemical compound over the components in a mold. When the compound hardens (after a 24-hour period) and the mold is removed, the result is a virtually indestructible package. Frank Balaszi (photo at left) of Division's Thermo-Bonding section holds one of the units (it takes two to make a sequence controller subsystem) beside a "red point vacuum" machine, in which the encapsulating process takes place. Mr. Balaszi (second photo) has a controller partially covered by the viscous encapsulating compound. Prior to potting, the controller is rigidly inspected and tested (third photo) by Ed Mortude and Floyd Wendelberger. Moss Stribling (fourth photo) of Thermo-Bonding runs visual checkout of finished controller prior to full-scale acceptance testing by other sections of the Division. Reliability of the subsystem is in excess of NASA's minimum standards, allows for probability of one failure in 10 million landings. Apollo spacecraft will be recovered with a cluster of three 83-foot Ringsail parachutes.

Fortnight in Review

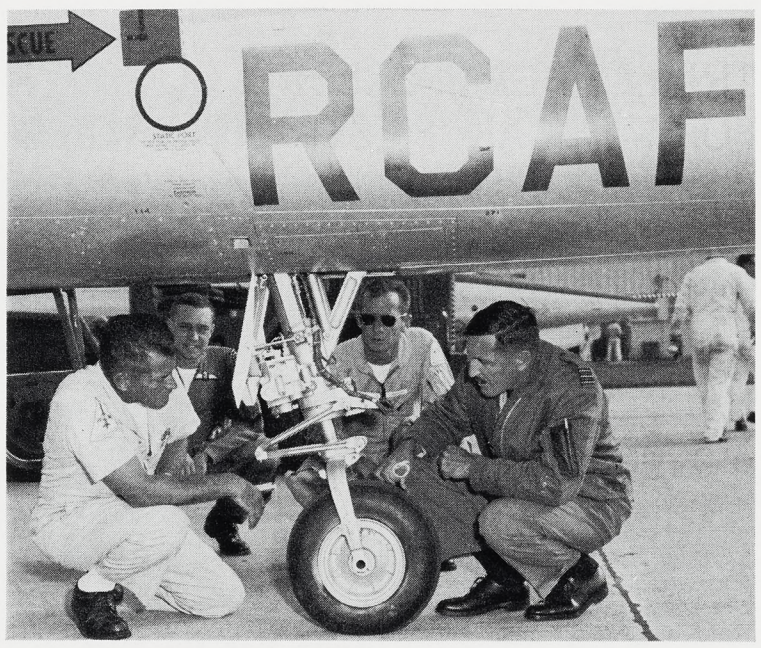
CAST FOR PARTS—Northrop Ventura Rod & Gun Club members have received permission to use the mall pool for casting with practice plugs. Chuck Simmers (left) and Joe Sliakis help Sue Lilley and Sue Saulsberry get into the swing of things in photo at left, then discover the gals have natural talent for distance and accuracy.



COMMUNICATIONS

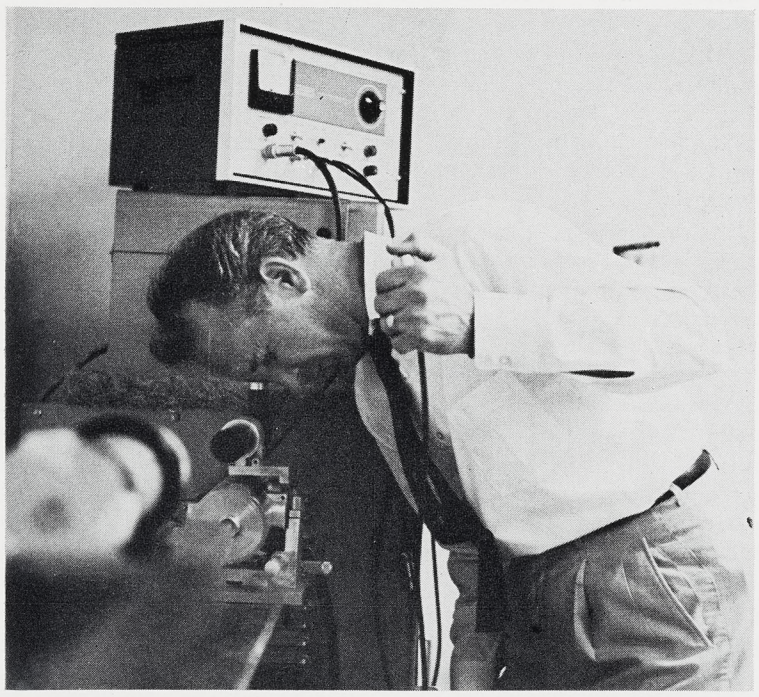
Twelve-position switchboard at Freeport, Grand Bahama Island, is part of Bahamas-wide voice communications system being installed by Page Communications Engineers, subsidiary of Northrop. System is expected to play role in developing island's tourist industry.

At Palos Verdes, Northrop Nortronics has installed a new laser laboratory (below), including two ruby and one gas lasers. Engineer Joe Laborde warms up the two ruby lasers, which are designed to operate in tandem with each other.



WAR & PEACE

South Vietnam soldier stands guard (above) over antenna installed and maintained by field engineers of Northrop Page Communications, Inc., as part of Back Porch Communications system in South Vietnam. Page troposcatter systems are spotted throughout the Pacific as part of world-wide military communications link. Peaceful deployment of Northrop F-5 is being planned for Canada, and Northrop provided demonstration flights for Canadian pilots this month for first time (left photo). Bill Sweet (left) and Casey Finnegan (second from right) of Northrop brief Royal Canadian Air Force Wing Commander Amos Pudsey (far right) and test pilot E. R. Thompson. The F-5 also was on display during the Canadian National Exhibition at Toronto.



Initial meeting of the recently-organized NSL-Huntsville Management Club was held at Sheraton Motor Inn and featured talk by Roy P. Jackson, Norair vice president and assistant general manager—NSL. At head table (from left) are Jerry Ligocki, Dr. S. S. Hu, Dwight Shelor, Ted Taylor, A. Wallen, General J. A Barclay, Mr. Jackson, A. E. Blythe, Marlin Sloan and Milton Beilock.

AIR FORCE PILOTS BRIEF POPULAR TELEVISION HEROES ON FINE POINTS OF NORTHROP TRAINERS

In photo at left, Robert Lansing (in cockpit), featured actor last season on Twelve O'Clock High television series, is checked out on T-38 by Captain Joe Stroface, test pilot assigned to Manned Spacecraft Operations, Air Force Flight Test Center, Edwards Air Force Base. Mr. Lansing holds private pilot's license. At right, John Forsythe is briefed by Major Roy Boyd, F-5/T-38 officer in the Northrop Air Force Plant Representative's Office prior to shooting scenes for John Forsythe Show. The program premiered September 13 and included shots of Norair's Palmdale facility.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Camping Equip., 3-burner Coleman stove, ice chest, 2-mantle lantern, $25. Box 1601. A

Range, O'Keefe & Merritt, gas, chrome top & griddle, $50. Hawthorne, OS 5-2433. A

Tuner, Neisner AM-FM, $15. Hawthorne, OS 9-1550. A

Cemetery Plot, dble. internment, on a slope, all improved, El Sereno plot, Inglewood Park, $550. Inglewood, OR 2-8468. A

Pontiac, GTO, 1965, 4-spd., positrac., chrome rev. wheels, AM-FM w/revibrasonic, tri-power, convt., $2700. Torrance, 370-3714. A

Air Conditioner, 10,500 BTU, 110 volts, 150 lbs., $150. Hollywood, HO 3-6327. A

Typewriter, IBM exec., elec., 12″ carriage, 5-yrs-old, used 6 mos., $350. La Mirada, 941-2551. A

Ford station wagon, 1958, r/h, stick V-8, o/drive, new eng., 10,000 miles, $395. Torrance, FA 8-6567. A

Wardrobe, complete, for little girl, sizes 5 & 6, $20. Hawthorne, OS 5-7965. A

Car Cooler, Allstate deluxe, blower model, $20 w/transformer, $25. L.A., OS 6-9855. A

Chrysler, 1957, 2-dr. h/top, good trans. & eng., orig. owner, $250. Hermosa, FR 6-1636.

Bunk Beds, guard rail, ladder, springs & box spring mattresses, $45. Torrance, 323-5740. A

Chevrolet, Impala, 1960, 421 cu. in. eng., 4-spd., Jardine headers, chrome rev. wheels, Caslers, $1500. Inglewood, 674-1847. A

Ford pickup, 1950, Olds eng., 3-spd. trans., $275. Torrance, 371-5916. A

Stereo Hi-Fi components, AM-FM tuner, dual amplifiers, dual preamps, 4 speakers, stereo turntable, $66. Hawthorne, 676-0418. A

Household furnishings, Danish modern, living & bdrm. set, 2-dr. refrigerator, sell sep. or $200. Gardena, OR 0-0415. A

Twin Bed Sets, 6, $25 ea. or $150. Gardena, 670-8284. A

Boat, 12′ fibreglass, w/7½ hp motor & trailer, $300. Hawthorne, OS 5-3866. A

Bar, 6′ by 4′, $100. Lakewood, ME 0-1364.

Comet, 1962 orig. owner, 4-dr., std. shift, r/h, $925. Fountain Valley, 847-0575. A

Sewing Machine, factory power, Wilcox & Gibbs S. M. Co., some attachments, $85. Torrance, 834-1378. A

Headboard, durable, $5. Gardena, 329-9484.

Lark, 1960, r/h, $275. Torrance, DA 3-1612.

Trailer, 16′ camping-type, sleeps 4, elec. brakes, ice box, stove, $350. Lawndale, OS 5-5483. A

Ford, station wagon, 1958, eng. recently o/hauled, r/h, w/s/w, $550. Rolling Hills, FR 5-5761. A

Judson Supercharger, newly rebuilt, fits all Triumph TR2-3 & 4, $75. Hawthorne, DA 9-8734. A

Plymouth Belvedere, 1957, convt., r/h, p/s, p/b, p/seat, $200. L.A., GR 7-1494. A

Piano, small console, w/bench, mahogany, made by Starr, $400. Torrance, 323-1698. A

Encyclopaedia Brittanica, 1955 junior edition, plus yearbooks to 1965, $30. P. V. Ests., FR 5-5097. A

Organ, Thomas electronic transistorized, Serenade, ebony, matching bench, 2 keyboards, 25′ pedals, Leslie speaker, plus 3 12″ speakers, many extras, $1500. Hawthorne, 679-4365. A

Motorcycle, 1965 Gilera, 202 super 1400 miles, 100 mpg., 20 h.p., extras, $650. Hawthorne, 679-5864. A

TV, 21″ RCA table model, new picture tube, $45. Cypress, 828-9075. A

House, lge. 3-bdrm., 2 baths, built-ins, extras, near school, $32,500. Rolling Hills Ests., FR 8-1420. A

House, 3-bdrm. & den, redecorated, $17,950. Inglewood, OR 4-0366. A

Mercury, 1964, Park Lane Marauder, 4-dr h/top, factory air cond., p/s, p/b, radio w/vibrasonic, $2500. Westchester, 645-7446.

MGA, 1959, 29,000 mi., r/h, $650. Hawthorne, OS 9-1632. A

House, 4-bdrm., built-ins, 4-yrs-old, will go FHA, $24,500. Torrance, DA 3-6018. La Habra, 714-871-3811. A

Acreage, lake frontage in No. Calif., terms, two 2½-acre parcels, $5750 parcel; two 5-acre parcels, $9500 parcel. L. A., 476-1635.

Refrigerator, Hotpoint, 75-lb. top freezer, $50. Torrance, DA 6-5457. A

Volkswagen, 1961, 2-dr., r/h, $1000. Lomita, 326-6145. A

Drapes, Beauti-pleat, 45 yds., covers 30′ at 84″ long, off-white, cotton boucle, $25. Torrance, DA 6-7996. A

SCUBA Regulator, U. S. Divers Calypso, single hose, $55. Torrance, 377-8535. A

Washer & gas dryer, Whirlpool Imperial, pink, matched set, $170. Inglewood, OR 4-7743. A

Bicycle, boy's 10-spd. Derailleur, $35. Hawthorne, 676-9731. A

For Sale

Corvair, Monza, 1964, 4-spd., $1425. Torrance, 371-8245. A

Pontiac, Bonneville, 1959, $750. Torrance, 378-8825. A

Motorcycle, Allstate Mo-Ped lightweight, 707 miles, $125. Huntington Bch., 714-962-2344.

Pups, boxer, AKC reg., champion backgrounds, $65 & up. Torrance, FR 8-4676. A

Transmission, 1955 to '65 Chevrolet 3-spd. w/Hurst linkage, $100. Gardena, DA 7-2029.

Bicycle, 10-spd. Derailleur, Italian-made, $40. Manhattan Bch., 372-6603. A

Ford, 1947, custom int., 15,000 miles, $300. Torrance, FR 8-1350. A

Refrigerator, Coldspot, 13.5 cu. ft., $50. Hawthorne, OS 5-1057. A

Chair, bucket-type, white, $15. Gardena, 679-1642. A

Darkroom Equipment, complete w/supplies, $175. Los Alamitos, GE 1-4233. A

Sofa Bed, love seat-size, conv., special fabric, $49. L.A., 645-3986. A

Coffee Table, round, w/2 stepdown tables, birch, Nev-a-Mar tops, $10. Orange, 637-0013.

Bicycle, boy's Schwinn Stingray, $15. Hawthorne, OS 5-0645. A

Wedding Ring Set, $50. L.A., 755-9158. A

Model A Ford, 1929, $250. El Segundo, EA 2-3420. A

Camper Windows, 2 18″x18″, 2 18″x56″ crank out-type, $25. L.A., 670-1304. A

Freezer, chest-type, 16 cu. ft., 500 lb. cap., 5-yr-old, $80. Redondo Bch., 376-1823. A

T-Bird, 1955, all powered, w/s/w, auto. floor shift, $1125. Inglewood, 673-0752. A

Platform Rocker, $20. Hawthorne, OS 5-2514.

Stove, O'Keefe & Merritt, gas, lge. oven, sep. broiler, storage drwr., $50. L.A., 755-8917. A

Boat, 15′ Glasspar, 35 hp Evinrude, conv. top, elec. starter & many extras, $695. Redondo Bch., FR 8-2609. A

Vacation Trailer, 1956, 15′ 8′x10′ awning side room, continental kit w/spare tire, other extras, sleeps 5, $750. Hawthorne, 679-7497. A

Minnie Bike, w/fenders & license, $125. P.V. Ests., FR 7-2294. A

Go-Kart, $60. Inglewood, PL 6-7681. A

Corvair Greenbier, 1961, r/h, 3-spd., 3-seats, $695. Inglewood, 673-2751. A

Bed, dble, extra long, $30. L.A., 472-6712.

TV, 21″ b&w, remote control unit, 1960 model, Scandia. walnut console, $75. Gardena, 323-8429. A

Trailer, custom teardrop, will sleep 3, fully equipped, $250. Garden Grove, 539-0670. A

Bar & 2 stools, $50. Inglewood, OR 4-0111.

Home, 3-bdrm., 1½ bath, 2-car gar., patio, fireplace, sep. laundry room, 5 avocado & 4 fruit trees, $24,950. Pico Rivera, 943-8187.

Pup, toy pomeranian, AKC reg., born Aug. 14, light tan, male, $125. Los Alamitos, GE 0-1952. A

Volvo, 1958, w/1959 eng., 3-spd., $325. Manhattan Bch., FR 2-0649. A

Tires, 2 tube-type, w/w, 710x15, $10. Gardena, DA 4-8853. A

Lot, single, Parkview, Inglewood Cemetery, $550 plus transfer fee, Torrance, TE 5-2128.

Table & 4 chairs, bronze, $25. Hawthorne, 679-5073. A

Renault Parts, complete rearend w/brake drums, head w/valves, water pump & fan, many extras, $50. Torrance, DA 6-5558. A

Wet Suit, including hood, sizes 40-42, fins, mask w/exhalation valve, $50. Torrance, 323-4257. A

Honda S-90, 1965, 2800 miles, take over pymts. of $24.50 mo., $400 w/insurance & interest. Lawndale, 679-9221. A

Corvair 95, 1964, Greenbrier, 23,000 miles, 4-spd., bucket seats, many extras, $1950. Hawthorne, 675-9557. A

Bedroom set, 2-yrs.-old, 9-drwr. dresser, chest of drwrs., 2 nite stands, dble. bed size mattress & box springs, $290. Lawndale, 676-3050. A

Luggage Rack, chrome, for station wagon, $15. Inglewood, PL 5-4497. A

Dinette Set w/6 chairs, blonde, $25. Torrance, FA 8-4243. A

Chevrolet, 1956 4-dr., V-8, auto. trans., $350. Box 1602. A

Drafting Machine, Bruning, 5-yrs-old, $60. Torrance, DA 4-0341. A

Exercycle, 2-spd. motor, $350. Brea, 529-3531. A

Austin Healey Sprite, 1959, head rests, AM radio, $850. Inglewood, 675-9540. A

Ford station wagon, 1955, Country Squire, $150. Manhattan Bch., 374-5028. A

Couch, & matching chair, 3, $100. Torrance, 834-2845. A

Horse, red sorrel gelding, $300. Torrance, DA 9-2016. A

Baby bottle sterilizer, Evenflo, electric, $5. Torrance, 371-8939. A

Home, near Northrop, 4-bdrm., 2-bath, near schools & shopping center, $32,650. Hawthorne, OS 5-4905. A

Pontiac, 1957, 4-dr. sedan, auto. trans., w/s/w, $350. Redondo Beach, 374-7416. A

Pups, Boston terriers, reg., 4 male, 2 female, 7-wks-old, $75. Yorba Linda, 528-5979.

Austin Healey Sprite, 1959, r/h, new tires & paint, $550. Manhattan Bch., 370-6472. A

Ford, 1957 4-dr. sedan, 6-cyl., auto. trans., completely o/hauled, $225. Hawthorne, 675-6788. A

Dinette table & 4 padded chairs, Formica & chrome, $25. Rolling Hills, 323-1626. A

Wanted to Buy

Bicycle, man's, 28″, 3-spd. in good condition. Torrance, 835-1031. B

Warren Hubs for Earley Wiley 4 W.D. jeep. Hawthorne, OS 9-6449. B

High chair, child's, reasonable. Inglewood, 677-9833. B

Sewing Machine, portable, elec., in good condition & very reasonable. Santa Monica, 393-7464. B

Lot or cabin, Crestline area, p.p. only. Inglewood, OR 7-8543. B

Pickup or panel truck, 1950-1954 Ford, Chevrolet, or GMC. Hermosa Bch., FR 2-3722. B

For Trade

Outboard Motor, 10 hp late model, trade for 7.5 & cash. Inglewood, OR 1-2058. C

Rentals Offered

Apt, 2-bdrm. utilities paid, $135. Inglewood, OR 2-0304. E

Apt, furn. single, elec. kitchen, tile shower, patio, gar., ½ blk. to beach, $90 mo., Redondo Bch., FR 5-8938. E

Studio Apt, 3-bdrm., 2-bath, unfurn., pvt. patio, closed gar., sound proofed, $175 mo. Torrance, FR 5-0867. E

House, 1 & 2 bdrm., lge., trash & water pd., no pets, $120 mo. Lawndale, 371-6775. E

House, 3-bdrm., family rm., 2-bath, 9-yrs-old, FA heat, garage, rear fenced yard, $200 mo. P. V., FR 7-6458. E

Apt, 2-bdrm, 2-bath, storage space in gar., washing facilities, $125 mo. Inglewood, 672-5798. E

Apt, 1 & 2-bdrm., closed gar., near schools, shopping & playgrounds, 10 min. to Nortronics P. V., $75-$125. Walteria, 375-2091, 375-9397. E

Cabin, Lake Gregory & Crestline, sleeps 6, $25 weekends, $60 wk. Venice, EX 1-2040. E

Apt, 1-bdrm., unfurn., on strand, ocean view, lge. deck, $225 mo. Manhattan Bch., FR 4-8842. E

Apt, 1-bdrm., unfurn., pvt. patio, gar., laundry room, lge. closets, near to transportation, adults only, $78.50. Gardena, DA 9-9195.

House, 3-bdrm., 1¾ baths, closed gar., fenced yard, water & lawn paid, near shopping, 8 min. to Norair, unfurn., $130 mo. L.A., PL 4-1964. E

Apt, 1-bdrm., furn., utilities paid, near Northrop, 1 person, $75; 2, $85. Lawndale, OS 5-9695. E

Apt, furn., deluxe 2-bdrm., 2 baths, fireplace, free hot water, ground floor, near Norair, $160. Hawthorne, 679-1358. E

Apt, 1-bdrm., single unit, pvt. patio & entrance, stove, refrig., adults, $115 mo., $110 w/lease. Inglewood, OR 7-9047. E

Apt, 1-bdrm., furn., pvt. deck, lge. pool, sub. garage, near Northrop, $145 mo. Lawndale, 377-4372, 679-7426. E

Apt, 2-bdrm., unfurn., 10 min. to Norair, $100 mo. P.V. Ests., 376-5941. E

Rentals Wanted

Secretaries, 2, willing to share 4 bdrm. house. Hermosa Bch., 374-7109. F

Personals

My appreciation for your evidences of interest in my recovery while I was ill. L. H. WALTON. L

Need ride to vicinity of N.W. Montana in mid-December. Will share driving & expenses. Anaheim, 776-0849. L

We Wish to thank our friends for their sympathy & flowers during our bereavement. ROSE & LARRY KORN. L

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

6:45 a.m. — 3:30 p.m.

Downey & Del Amo, Lakewood. T. L. Reeve, Norair, ext. 1591, ME 0-1364. 10

7:30 a.m.—4:15 p.m.

Brookhurst & Warner, Santa Ana. J. P. Hewes, Norair, ext. 2597, 531-1942. 3

La Brea & Arbor Vitae, Inglewood. Need ride home only. Barbara J. Valpe, Mariposa, ext. 4186, OR 3-2740. 3

8 a.m. — 4:45 p.m.

Manchester & Airport Blvd., Los Angeles. D. J. Hall, Norair, ext. 2535, 645-6815. 5

Thousand Oaks. M. S. Shapiro, NSL, ext. 2853, 805-495-9601. 5

Peninsula Center & Grandview Area, Palos Verdes Peninsula. H. R. Welton, Norair, ext. 2171, 377-2101. 5

Rides Offered

7:30 a.m. — 4:15 p.m.

Brookhurst & Warner, Santa Ana. J. P. Hewes, Norair, ext. 2597. 531-1942. 13

8 a.m. — 4:45 p.m.

Thousand Oaks. M. S. Shapiro, NSL, ext. 2853, 805-495-9601. 15

Peninsula Center & Grandview Area, Palos Verdes Peninsula. H. R. Welton, Norair, ext. 2171, 377-2101. 15

PLEASANT SURPRISE

Q. C. Lampkins, Northrop Norair metal fitting mechanic, throws up hands in mock surprise as he receives five Suggestion Award checks (total: $110) from Foreman Pat Garrett (left) and General Foreman Ed Nolan. This was his first venture into Suggestion Award Program and he's followed up with four more currently being evaluated.

LIFTING BODY: Northrop Craft Featured in Washington Display

(Continued from page 2)

The HL-10 and M2-F2 are designed as forerunners of future vehicles to enter earth's atmosphere from outer space at orbital speeds. The two craft, built by Northrop, will be used for manned sub-orbital flight tests in the critical terminal approach and landing phase of entry flight. Vital knowledge of aerodynamic and controls performance, as well as pilot/vehicle compatibility, is expected to be gained from these flights.

While both the M-2 and HL-10 are half-cone shaped, with blunted noses and boat-tailed horizontal trailing edges, the primary differences in configuration are in their fins, cockpits, and body surfaces. The HL-10 has three fins compared to two for the M2-F2 and has its cockpit recessed to provide an unbroken body line, while the M2-F2 has a bubble-shaped canopy. The HL-10 is also flat on the bottom, whereas the M2-F2 is flat on the top.

Both the HL-10 and the M2-F2 will be launched from the wing of a B-52 airplane in X-15 fashion. They will be dropped at approximately 45,000 feet altitude and Mach 0.8 speed, to glide to conventional airplane-type landings. Both will utilize a special 22-foot long Northrop Norair adapter which will be attached to the existing X-15 launch pylon on the wing of the B-52.

The newest Northrop lifting body research vehicle is scheduled to be completed for delivery to NASA in January 1966, approximately seven months from the time initial fabrication work began.

AUTOMATION

(Continued from page 2)

flight performance measurement system with automatic decision-making capability.

While the primary function of the VWS is to warn pilots of malfunctions in aircraft performance, it also makes a recording of each malfunction which ground maintenance crews could listen to prior to servicing the aircraft.

Checkout equipment would be used at the base to relieve the flight-line of maintenance which requires more time than normally allotted to rapid turnaround.

Similar equipment would be installed at a depot to insure that articles sent to the base will perform for the established "between service" time span.

HACHTEN NAMED TO DIRECT PR EFFORT AT NORAIR

Richard A. Hachten has been appointed head of Public Relations for Northrop Corporation's Norair Division, Norman Warren, Corporate director of Public Relations and Advertising, announced. Mr. Hachten has served as assistant manager of Public Relations for Northrop Norair since last March and succeeds Donald R. Roberge who resigned to enter the field of education.

Ben H. Scarpero replaces Mr. Hachten as assistant.

Mr. Scarpero joined Northrop recently after completing 20 years of service with the USAF where he last held the position as director of Information for Hdq. 19th AF.

Mr. Hachten was Public Relations administrator for Hughes Aircraft Company for nearly four years. For approximately 12 years before that he was affiliated with Curtis Publishing Company. He is a graduate of the University of Southern California where he majored in journalism and is a member of Sigma Delta Chi, national honorary journalism fraternity.

Mr. Scarpero's last Air Force assignment was in the grade of major at Seymour Johnson AFB, North Carolina. He had also served in Air Force public assignments in Japan and Los Angeles. During a period following World War II, he was employed by the New Orleans Item and later the UPI in that city, as well as serving as director of Information for the New Orleans Port of Embarkation.

Mr. Scarpero is a graduate of Louisiana State University and is a member of the Aviation/Space Writers Association, the Wings of Club of New York, the Air Force Association, and Sigma Delta Chi.

MICOM SYMPOSIUM—Bob Timboe and Paul Potts (standing in rear) lead one of several sessions at software symposium hosted by Nortronics this month at Anaheim for key employees of U.S. Army Missile Command (seated). Week long symposium was based on Nortronics' eight years experience in software support of Navy automatic checkout equipment programs at Anaheim, but was slanted toward adoption of Northrop techniques to missile checkout equipment (story on page 1).

VWS: Problem of Visual Loading Solved

(Continued from page 1)

has been tested at less than three seconds, compared to an average of 12 seconds or more to a visual warning.

It is the Voice Warning System (VWS) developed at the Weapons Status Reporting Equipment group under the guidance of Al R. Vogel, chief.

VWS has been a part of the B-58 for several years, following installation on some 100 Hustler bombers. And its use is not restricted to aircraft. In Minuteman installations across the country a variation of the system called Voice Reporting Signals Assembly is tied into test equipment and telephones. When a light informs the missilemen of a malfunction at a silo, they dial the silo number and VWS tells them what specific part the installation needs. Without going to the silo to investigate, they can select the parts and tools needed for the job and truck them to the distant silo.

In addition, Compsip, a French shipbuilding organization, has included VWS in an automated motor ship for the Norwegian commercial fleet.

At the present time, the U.S. Army Aviation Test Board at Fort Rucker, Alabama, is evaluating VWS in three types of aircraft for the Aviation Material Command, with William Stroub as project engineer for Northrop.

Two separate contracts with the U.S. Navy are in effect, with Bob Quinn as project engineer.

Environmental tests of VWS are in progress at Palos Verdes under the BUWEPS contract. Factors involved are cold, heat, altitude, vibration, shock and electromagnetic interference. These tests are being directed by Engineer John Buck. Thirty-four units will be delivered, of which 27 will be installed in aircraft.

In operation, Voice Warning System accepts signals from the vehicle's sensors, and these signals are fed into a simple logic system.

VWS provides 20 message channels. If more than one hazard occurs at one time, the logic network plays the warning of highest priority. If a warning is being played and a higher priority condition occurs, the first warning is interrupted by the more urgent one.

The pilot has the option of flipping an override switch and holding messages. He can later determine if any uncorrected problems exist by activating a reset switch. If the problems no longer exist, no message will play.

Warning lights and signals already part of the aircraft are retained when VWS is utilized.

CMIP: Another $19 Million Added To Growing Total of Cost Reductions

(Continued from page 1)

new business is this policy statement quoted by Mr. Nolan from the official guidelines defining the Department of Defense cost reduction program:

"In making future source selections and in determining profit and fee rates on negotiated contracts where cost analyses are obtained, the Department of Defense will take into account the nature and effectiveness of a contractor's cost reduction program."

CMIP work is conducted by a committee of coordinators headed by Ken Hornor in the Corporate office. Each facility is represented on the committee by its own coordinator.

Cost improvement items may originate as a management-planned economy, as a team development or as an individual employee's idea.

One such idea from an individual provided a saving this year of $311,143. Joseph Radigan, director of Marine Navigation Systems at Nortronics (Palos Verdes) suggested that a standard drawing be developed for the Nortronics Floated Inertial Platform (FLIP), which in the past required adaptation to each new customer's requirements.

The drawings then required only tabulated changes to be useful on any given contract.

Another idea, from L. J. Wisken of Project Liaison Engineering at Norair (Palmdale), effected a $153,000 cost reduction.

Three government categories have been established to record types of cost reduction items: Reduction of Operating Costs, Buying Only What Is Needed, and Buying at Lowest Sound Price.

During fiscal 1965, reduction of operating costs accounted for an overwhelming proportion of saved dollars, $13,864,525 and 903 items. Within this category, organizational changes investigated since early 1964 were accomplished during the year, eliminating some operations and improving others.

Buying only what is needed saved $2,484,656 based on 164 items, and buying at lowest sound price provided savings of $2,756,039 on 276 items.

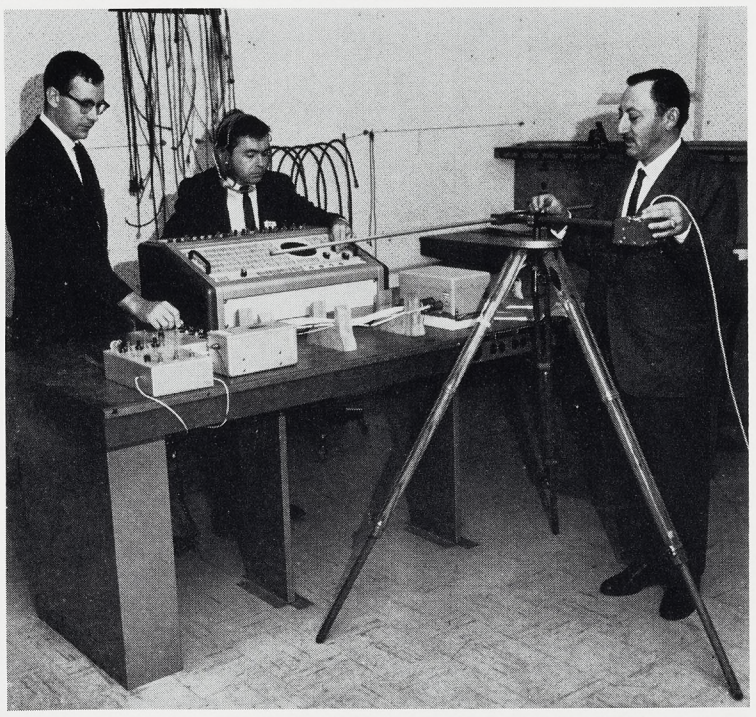
AID

(Continued from page 1)

ture and date will be required of those giving to the suggested AID standard — one-half of one percent of their weekly wage (equal to 12 minute's work). The same is required of those who wish to give a set amount each week.

Because of the thorough briefing given campaign workers and special kits supplied them, most employees will find solicitors able to answer campaign questions. Other answers will be supplied by AID-NORAID campaign chairmen located at each major function.

Marie Tully at Norair is the over-all Northrop campaign chairman. Facility chairmen are: Nortronics, Harry Belcher (Anaheim), Bob Kealhofer (Hawthorne), George Richards (Palos Verdes), and R. J. Jonas (Cape Kennedy); Norair, Polly Middleton (Mariposa), Tom Post (Palmdale), Kelly Burke (Edwards AFB), Larry Long (NSL), and A. E. Blythe (Huntsville); Corporate office, Arlene Lewis.



RELIEF FOR PILOTS—John Buck, Nortronics engineer at Palos Verdes conducts environmental tests of Voice Warning System under contract to U.S. Navy Bureau of Weapons (BUWEPS). Bob Carter of U.S. Naval Ammunition Depot, Crane, Indiana, is at left.

RECREATION

NRC Plans Awards Fete For Softball Champions

Northrop Recreation Club will pay tribute to 1965 softball champions at a special awards dinner set for 7 p.m. September 25 at the NRC Clubhouse.

Tickets for the affair, which will feature a buffet, beverages, dancing and trophy presentations, are $1.25 a person. They are available through Personnel Activities offices, team managers and NRC commissioners.

Slated to receive trophies as champions of the NRC-sponsored 12-inch Alondra Park slo-pitch league are the Chavez Regals. Managed by Alan Larson, the team includes Dan McCarthy, John Patierno, Don Baumgartner, Hans Reuter, Mike Johnson, John O'Hara, Dick Manuel, Dave Freeman, Henry Olivier, Mike Sulentich and Geoffrey Hicks. The winners copped the title in a league of six teams.

The undefeated Softwares team of the six-team 16-inch slo-pitch league, also at Alondra, will also be feted with trophies. Managed by Victor Garcia, jr., the team includes Joe Petty, Grant Newton, Rudy Fontes, John Warner, Tom Lusk, Paul Bewley, Tony Lobise, Ron Beatty, Chris Tierheimer, Harvey Honda, Richard Lenart and Jerry Pillow.

Also slated for honors are the Hawks, an NRC-sponsored team in the Los Angeles County regulation Class C league at Alondra, that copped first-place honors for the year.

Maury Shulman managed the team that included Larry Beuder, John Lavender, Ron Gregory, Art Valdez, Frank Kawaguchi, Pete Katzaroff, Chuck Chamberlain, Fred Seale, Frank Makatsukasa, Bill McNair, Dick Geroux, Don Palamara, Ken Mengerson, and Dick Wood.

Equipment is available in quantity and funds have been carried over for operational purposes. Present plans call for an election of officers, plus the mapping of plans for special events, and tournaments with other clubs.

Weekly sessions will be set up after participants indicate their choice of nights.

All Nortronics, Norair and NSL bridge players are invited to attend the initial meeting or to contact Commissioner Kirkeby at ext. 1030 at Nortronics (Anaheim).

* * *

Bridge Club Plans Reactivation Fete

Reactivation of the popular Nortronics NRC Bridge Club is in the offing with a kickoff meeting set for 7:30 p.m. September 30 at the NRC Clubhouse, 1834 W. Valencia, Fullerton.

Commissioner Jack Kirkeby of Nortronics (Anaheim) reports the club has been inactive for the past year, but plans a full round of events, plus weekly sessions, if interest warrants.

European Posts Go To Key Executives

New assignments for two key Northrop Corporation executives in Europe have been announced by Thomas V. Jones, Northrop president and chairman.

Geoffrey Parsons, who has been vice president and manager of European Operations, has been named vice president and European representative. He will be based in Paris, and will report directly to Glenn R. Lord, Corporate vice-president - Marketing, and will perform specific assignments for the company's top management.

Gwynn Robinson, who has been an executive of Northrop International at Beverly Hills, has been appointed to succeed Mr. Parsons as vice president and manager of European Operations.

He will be in charge of Northrop's Paris office and of all Northrop International Operations in Europe, North Africa and the Middle East. He will report to General P. W. Timberlake, Corporate vice president-Northrop International.

LEIBERT

(Continued from page 1)

students, and finances.

His chapter also runs a placement service for workshop participants who reach a level of skill and self sufficiency, compatible with the requirements of private business and industry.

"Right now our biggest problem is finances to cope with the steady growth of both classes and workshops," Mr. Leibert said. "It won't be long before we need a third bus, which we hope to purchase with blue chip stamps received from donations. We need money for scholarship, plumbing and other facilities maintenance, but most of all we need interested people to volunteer their services for the workshops."

ECF must raise many of its funds and sponsors such activities as a musical production by the Los Angeles Youth Theater Group, an annual fashion show and fireworks stands during Independence Day celebrations.

The 12-year Northrop veteran is now in his fifth year with the ECF and in addition to the two local responsibilities he is a member of the California Conference of Workshops for the Handicapped.

Semi-annual interest checks, in guaranteed amounts, are the good returns you get from investments in "Series" U.S. Savings Bonds.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 17 | October 6, 1965

Northrop's Net Income Increases

Northrop's consolidated net income for fiscal 1965 was $8,683,000, an increase of 28 percent over last year, it was announced by Thomas V. Jones, president and chairman. Earnings for the fiscal year, which ended July 25, are equivalent to $2.10 per share on 4,126,446 shares outstanding at the year end, as compared with $1.66 on 4,085,439 for the previous year.

Net sales for the twelve months totaled $339,324,000, an increase of 12½ percent over the previous year's sales of $301,811,000.

While the F-5 tactical fighter and the T-38 supersonic trainer comprise the largest single product category in the past year's sales, more than half of the company's volume represented sales primarily of guidance and tracking systems, communications systems, recovery systems for manned orbital space vehicles, and such precision equipment as inertial guidance gyros and marine equipment in the communication and detection field, according to Mr. Jones.

In the fourth quarter of the year ended July 25, 1965, consolidated net income totaled $2,547,000, equivalent to 62 cents per share, as compared with $2,089,000, equivalent to 51 cents per share a year earlier. Net sales for the quarter totaled $83,430,000, compared with $82,559,000 in the prior year.

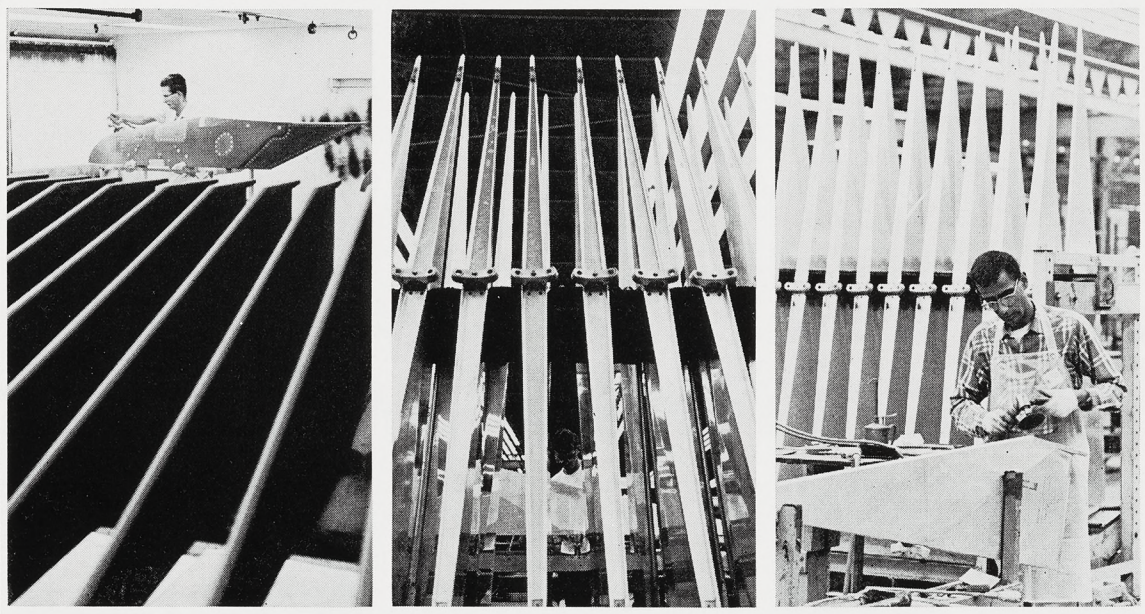
The company's sales backlog at the close of the fiscal year amounted to approximately $288,000,000 as compared with $423,000,000 a year earlier. The year end backlog figure, however, does not include approximately $100,000,000 in aircraft contracts already in work.

New Fringe Benefit Feature Makes Debut

A new NORTHROP NEWS feature covering a topic of general interest to all employees—fringe benefits—makes its debut on page 3 of this edition.

William Larrabee, Corporate vice president—Industrial Relations, has written the first article. The new feature will be continued in forthcoming editions.

MANY THOUSANDS LATER . . .



Familiar sight to Northrop Nortronics (Anaheim) employees for years is stack of wings for Hawk surface-to-air missile in production area. Nortronics began research and development in this field in 1954 with volume production beginning in 1957. Technicians above are shown performing various production routines.

SKATEBOARDING—SURELY IT'S AN ART

Joe Kalina, an artist in Graphic Arts at Nortronics Palos Verdes took his first jaunt on a skateboard recently, borrowing the board from a four year old neighbor.

The first cast came off his right hand September 18 and the final one was removed last week.

It was Joe's second lap that got him. He lost control on a turn and went off a curb. His hand got caught between his body and the curb.

Riley Wins Tri-State Tennis Tournament

Len Riley, who heads the Purchasing, Material Proposals and Advance Planning functions at Palos Verdes, recently won first place trophy in the Veterans doubles classification of the Midwest Tri-State Tennis Tournament which has just concluded.

This tourney, held at Amarillo, Texas, annually attracts top players from all over the nation and had 253 entrants this year.

Playing with his brother, Glyn, who is nationally ranked, the brother combination breezed through all their matches without the loss of a set, beating an Oklahoma entrant in the finals 6-3, 6-3.

Len formerly played varsity tennis at West Texas State University.

NORAID Elects Officers; Balsam Joins Directors

George Gore has been named chairman of the Board of Directors of Northrop Corporation's in-plant charity organization, NORAID Inc., and John Richardson has been elected president. For Mr. Gore, it will be his ninth consecutive term as chairman and his eleventh year on the board.

Selection of these two key officials, other officers and board members, came at the annual NORAID, Inc. meeting held September 16.

Joining the board of directors for the coming year are four new directors, Jack Mannion and J. D. Matthews of Norair, Lloyd L. Balsam of Nortronics, and C. C. Cilley of the Corporate office. Holdover directors are Mr. Gore of the Corporate office, Elmer Noonan of Nortronics, Paul Crews, Don Grothe, Mr. Richardson and Ben Trump of Norair.

Marie Tully, vice president and secretary, and George Forbes, treasurer, were re-elected NORAID officers. In addition, Ernie Boren was re-appointed accountant and Mrs. Tully was re-named NORAID administrator.

In other action, the board of directors re-affirmed all NORAID Facility committees.

The Norair Hawthorne committee is composed of R. B. Scott, chairman; Isabelle Ainge, Tom Brazil, George Forbes, Louise Hobson, Dale Huss, R. W. Robinson, Josephine Roth and Hazel Salmon.

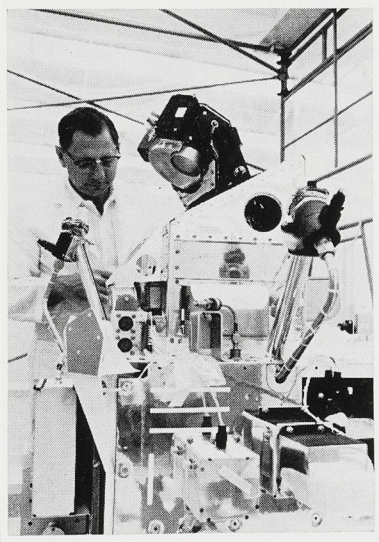
Harry Belcher doubles as chairman of both the Nortronics Hawthorne and Nortronics Palos Verdes and Anaheim committees. The Hawthorne group includes Dorothy Baldwin, John Janulewiczs, Floyd Jones and Donald Weaver. Serving at Palos Verdes and Anaheim are William Carey, Don Taylor and Sally Willsey.

Nortronics Cape Kennedy, Florida, is represented by a committee chaired by R. F. Jonas and including R. K. Hevenor, H. R. Hauser and A. A. Davidson.

Kelly Burke is chairman and L. R. Weltz co-chairman of the Norair Edwards AFB committee which also includes Frank M. Harrison.

Norair Palmdale is represented by Tom Post, chairman, Eutha O. Dame and Frank White.

The Norair (NSL) Huntsville, Alabama, committee is made up of A. E. Blythe, chairman, Fred Hertel and Marlin Sloan.



While Northrop's OV2-1 satellite awaits launch at Cape Kennedy, Burgie Burgmaier of Northrop Space Laboratories works on final assembly phase of OV2-3. Both satellites are bonus payloads on Titan III-C development launch.

CAROLINA COMPANY ACQUIRED

Northrop has reached agreement in principle with Celanese Corporation of America on the acquisition of Amcel Propulsion Company, a division of Celanese. Amcel Propulsion develops and manufactures chemicals, explosives, ordnance and rocket propulsion devices for the Department of Defense and NASA at its plant near Asheville, North Carolina.

In addition, to its weapons and rocket work, Amcel does engineering and systems design and produces control devices for the capital equipment market outside the defense industry.

Northrop announced that it planned to acquire the assets of Amcel Propulsion for cash, although no price was disclosed. Amcel Propulsion will be renamed Northrop Carolina, Inc., and will be operated as a wholly-owned subsidiary of Northrop Corporation.

Thomas V. Jones, Northrop president and chairman, said, "Amcel Propulsion's products have growth potential which can be developed and accelerated through Northrop's extensive experience in aerospace weapons and systems. Also, Northrop's capability in the development of electromechanical control devices for the aerospace industry should prove most useful to Amcel's expanding commercial business. Thus, it is a logical acquisition that insures continuing growth for the present Amcel organization.

"Amcel's current management and operating personnel have our

(See AMCEL, page 6)

NSL SATELLITE MISSION SLATED THIS MONTH

A space environment sensing satellite designed and built by Northrop Space Laboratories will be placed in orbit as a "bonus" payload on the development launch of the second USAF Titan III-C from Cape Kennedy this month.

Developed for the Air Force's Office of Aerospace Research, the satellite is designated OV2-1, for Orbiting Vehicle Two, first

Related story on page 4

article. (Northrop is building a second OV2 to be launched similarly as a bonus payload on a later Titan III-C development flight.)

The OV2-1 carries sensing instrumentation for 14 experiments on various factors in the space environment. Mission requirements call for the satellite to collect and transmit the derived data for a period of one year in orbit.

Primary objective of the Titan flight is to test complete system performance of the mighty Martin space booster, most powerful ever launched by the Western

(See SATELLITE, page 6)

A FAMILY AFFAIR

On the Trail of an Era Long Extinct

Hunting for arrowheads, according to George Richards, is a family affair, and where family activities are concerned the Richards' have a numerical advantage.

Mr. Richards, supervisor of Personnel Administration at Nortronics Palos Verdes, has been hunting for arrowheads and Indian artifacts throughout Southern California for more than 10 years.

He has the help of an attractive blonde wife, Ginny, and four sons, Bart, 16; Mike, 15; Greg, 12; and Chris, 9. Together they have wandered around the High Sierras, the Mojave Desert, Big Bear area, and Palos Verdes, near their home. Soon they plan to visit Santa Barbara and the channel islands.

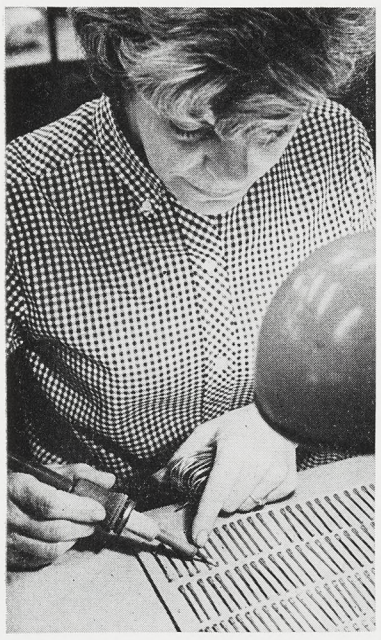
The Richards' finds range from crudely formed arrowheads made by ancient Pinto tribes, three or four thousand years ago, to those carefully chipped into exact arrowhead shape by the Piutes as recently as the 19th century.

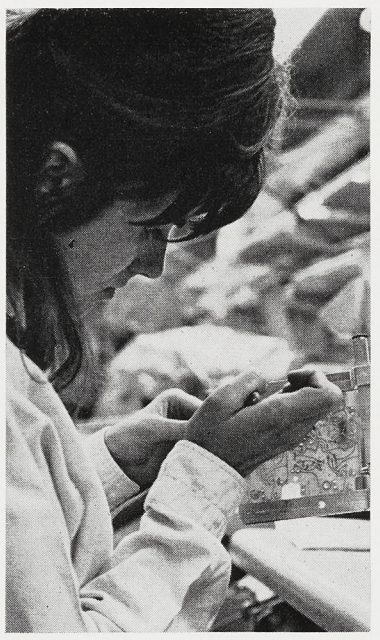
They have come across other Indian artifacts as well as the arrowheads, including a stone pipe, knives, scraping tools, axe heads, and awls. A war hatchet head found near Big Bear retains traces of red paint applied several hundred years ago.

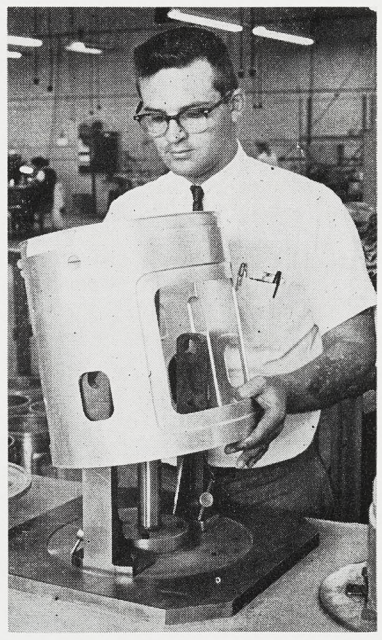
The Richards started their arrowhead searches while they were on a trip to Hawthorne, Nevada. They were driving through a long pass between low lying buttes that looked to George like "Indian country".

The family (there were only

(See ARROWS, page 6)







Aero products are diversified. In photo sequence from left, Josephine Oriface solders reeds to fit frequency meters, Scotty Carruthers checks decoder subassembly, Maureen Lawrence and Frances Seale assemble two of a variety of circuit boards, and Dan Snively inspects aft nose section destined to become part of a Maxson drone.

Switches, Sensors Pace Growth of Aero Facility

Like many other organizational components of aerospace companies, Northrop Ventura's Aero Instrument Facility in North Hollywood was once an independent corporation.

Aero Instrument first opened its doors as a school rather than as a manufacturing concern in 1943 and became a product-line oriented company three years later.

The company had proprietary rights to a patented cup-shaped diaphragm which, utilized in a variety of pressure switches, provided an unusual degree of reliability.

It also had an organization, and technological and production capabilities that could be useful in support of a corporation desiring the strength of diversification.

So, to the mutual benefit of Northrop and Thomas O. Cox, the head of the firm, in 1960 Aero became a facility of Northrop Ventura. Mr. Cox remained as director.

In the fall of 1964, Mr. Cox retired and Richard M. Warner, a member of the Northrop staff since 1940, took over the directorship.

Mr. Warner had held managerial positions in manufacturing, quality control and engineering, a background suited to the direction of an autonomous facility.

With the addition of Bill Chew, a new chief engineer, and Ed McGinnis, chief of quality control, plus realignment of the production operation functions under Scotty Carruthers and Paul Studt, Aero is continuing a growth and expansion cycle. By the end of the year Aero will have established totally new production capabilities for a recently designed pressure transducer, in addition to expanding facilities and capabilities in the standard product lines.

Mr. Warner
Director

Mr. Illes
Marketing

The facility is still product oriented, operating almost like a company within the Ventura Division. About half of its business is with the government and half with commercial firms.

Aero had been producing reed frequency meters and running time meters since 1946. In 1952, John Lovick, instrument research engineer, conceived and designed the patented pressure switch.

The patents are based on a cup-shaped diaphragm which to date has permitted a record 300,000 cycles without failure on tested units, far exceeding the usual aeronautical requirement of some 10,000 cycles.

The switch, designed for the Lockheed P2V, is still being used in the patrol aircraft. The design has been adapted for use on the Boeing Vertol Chinook CH-47A helicopter and other Boeing helicopters. In these craft it is used typically within engine warning systems, indicating fuel or oil pressure, or hydraulic system pressure.

Mr. Lorentson
Office Manager

Mr. Chew
Chief Engineer

It will also find a place as a depth switch in one of the U.S. Navy's advanced torpedo designs, the Mark 48. Allis Chalmers includes the Aero switch in fuel cells for the space program, and a North American jet trainer utilizes Aero pressure switches.

The basic design is adaptable to a variety of environmental extremes.

Aero products have since been expanded to include the pressure transducer, frequency converters for meters, and pointer indicating frequency meters.

The facility also manufactures electronic decoders, servo motors, junction boxes and electronic harnesses and printed circuit assemblies for Ventura and other customers.

The electronic decoders are the heart of the flight control system and will find their way into the radio control system of targets and drones. The servo motors, built at Aero to fit the needs of the division, provide a highly reliable control surface actuator for the Ventura targets and drones.

The pressure transducer is becoming a leading item, and a contract for production of a substantial number of units a year is in effect with Maxson Electronics of Long Island, New York. The transducer fits into a Mach 3 drone, the AQM-37A, driven by a Rocketdyne liquid-fueled rocket.

Other firms are investigating its use for adaptation to their products.

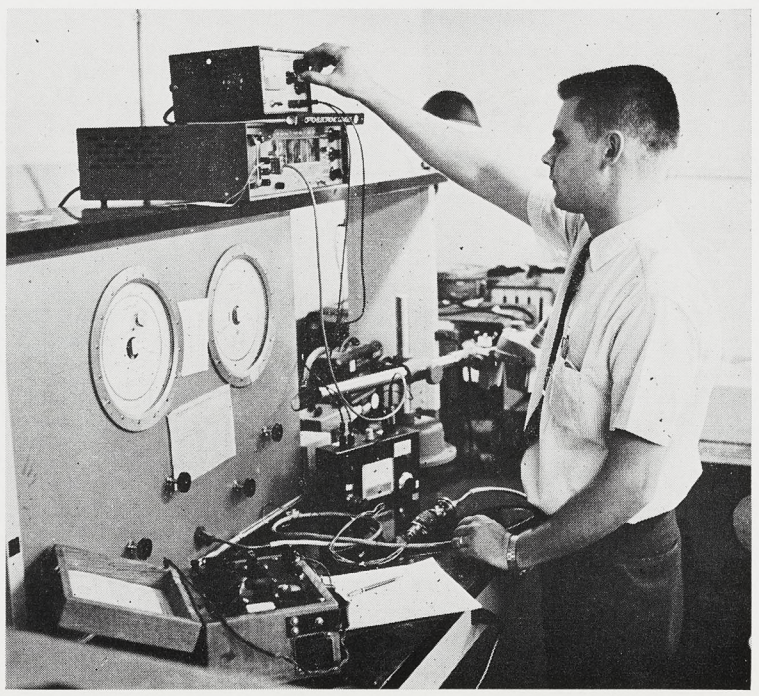
Utilizing photoconducting cells

(See INSTRUMENTS, page 5)

PRODUCT REVIEW

Pressure switches like one being inspected in left photo by Martha Lyth and Darrald Wolfe must meet rigid specifications. This switch measures fuel system pressure in North American T-39 jet. Above, Gladys Young assembles servo motors for drones built by Ventura. Newest product at Aero, right photo, is pressure transducer being tested and calibrated by Dick Hauer, who designed the unit.

Photos by
Bill Cox, Bob Steingart



Open House At Palmdale October 17

Northrop Norair will roll out the welcome mat for all Northrop Corporation families October 17 at its Palmdale Production Flight Test facility.

The occasion will be a special open house just for Northrop people held in conjunction with an Antelope Valley Aviation Day observance open to the public.

Richard E. Horner, Northrop senior vice president and Norair general manager, announced the special Northrop open house was arranged in response to numerous requests by employees for an opportunity to see completed F-5 tactical fighters and T-38 trainers in static display and in flight.

"Our open house will afford Northrop families a close look at our final assembly and flight test operations," Mr. Horner said. "Later, at the Aviation Day observance, they will see both the F-5 and T-38 in flight along with other aircraft as well as an outstanding program."

Because the open house is exclusive for Northrop families, special gate passes will be required for admittance. They may be obtained from all Personnel Activities offices throughout Northrop.

Gates at the Palmdale Production Flight Test facility will open at 9 a.m. and close at 11:30 a.m. with the area to be cleared of visitors by noon.

Northrop families will be able to move through the major areas of the facility to view each step followed by fighters and trainers from arrival to preparation for delivery.

Following the Northrop open house, families will have ample time to move to special parking areas reserved for the Aviation Day event. Families are also invited to bring along basket lunches, since food services will be available only in the form of limited catering facilities.

At 1 p.m. the Aviation Day gets under way with special static displays of all aircraft currently being processed at Air Force Plant 42, including both the F-5 and T-38. Special fly-by events will follow.

Climaxing the afternoon's entertainment will be a special precision flight demonstration by the famed U.S. Air Force Thunderbirds.

FOR SERVICES RENDERED—Northrop Norair's Charles W. Eyres (right) recently received special certificate for services rendered American Institute of Aeronautics and Astronautics by National President Richard E. Horner. Mr. Horner is Northrop senior vice president and general manager of Norair. Norair models in foreground are symbolic of division's work in both aeronautical and astronautical fields.

AF OFFICERS BEGIN TEN-MONTH TRAINING PERIOD AT NORTHROP

Air Force Captains John W. Cannon and Gene C. Sue have reported to Northrop Corporation to begin a 10-month Education With Industry program in Industrial Planning and Procurement.

The two officers, assigned by the Air Force Institute of Technology, will pursue their studies at Northrop's Corporate office and at Norair, Nortronics and Ventura Divisions. They will receive on-the-job training in Northrop management procedures, approaches, philosophies, tools and techniques.

Captain Cannon entered the Air Force in 1957 after obtaining a B.S. degree in industrial arts from Memphis State University. Captain Cannon has served the Air Force as an aircraft commander, instructor pilot and flight examiner. His most recent duty assignment was with the Office of Aircrew Standardization, 38th ATS (MATS) at McGuire AFB, New Jersey.

Captain Sue holds a B.S. degree in business administration from Ohio State University and has been in the Air Force since 1954, serving as a senior navigator, operations officer and standardization officer. He comes to Northrop from a duty assignment with the 437th Fighter Interceptor Squadron (ADC) at Oxnard AFB, California.

Harry Blocher, supervisor of Training Equipment branch, Field Service and Training group, Product Support department at Northrop Norair, will coordinate the training program of the two officers at Northrop.

Disneyland Tickets Are Still Available

Tickets are still available to Northrop personnel for the Association of the United States Army's Disneyland night, Friday, October 22.

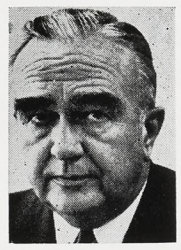
The Greater Los Angeles Chapter of AUSA extended its invitation to people from Northrop at the special association rate of $3.75 per person for admission and unlimited use of Disneyland attractions. The tickets may be obtained from Personnel offices.

TOUR CANCELLED

The NRC Travel Clubs' tour of Mexico scheduled for the yearend holiday will not take place as planned. Arrangements were being handled through the Nortronics Anaheim Personnel Activities office.

FRINGE BENEFITS

A Balanced Program



by WILLIAM LARRABEE
Vice President—Industrial Relations

Not too long ago I was discussing Northrop's fringe benefit program with one of our young men, when he suddenly said:

"It seems to me that you Industrial Relations people are missing a bet by not having our paycheck stubs include a list of every fringe benefit with a big black FREE printed alongside it."

Well, there just isn't room on a paycheck stub to list all our fringe benefits but the basic idea—that fringe benefits are an important and often overlooked aspect of working with Northrop and that our people want to know about them—stuck with us.

This was confirmed in a recent survey taken by an outside agency on what employees thought of the Northrop News. In that poll, an overwhelming majority of the people said that they wanted to hear more about the Northrop Fringe Benefit Program.

Therefore, in the forthcoming issues of the Northrop News I will discuss our benefits and illustrate how they affect each of us.

It might be helpful, initially, to point out again the general policy of Northrop with respect to all types of compensation, including fringes. From the very beginning of the company it has been clearly stated that Northrop people are to receive wages and benefits comparable to those prevailing in our industry. Today, this policy is reaffirmed and continuously reviewed by our president, Thomas V. Jones.

Consequently, studies are continually made of compensation patterns on national, state and local levels. This work is done under the direction of your Interdivisional Industrial Relations committee which is made up of the directors of Industrial Relations of each Division and the Corporate director of Industrial Relations.

Last May, important benefits were extended to Northrop people in the way of wage increases, group insurance improvements, vacation entitlements, bereavement pay, extended layoff benefits, etc. Still under consideration are possible improvements to our savings and retirement plans, further benefits in the field of group insurance and other matters.

On some of these having to do with retirement we have to go to our stockholders for approval and most changes require the concurrence of appropriate government agencies. At the next stockholders' meeting in December we will ask for approval of several retirement plan changes involving better minimum guaranteed pensions, better early retirement provisions and an amendment providing that the new Social Security base will not reduce our retirement pay. It is anticipated that announcements will be made in the not too distant future and certainly before the end of the year on these and other subjects.

The Northrop program is a balanced program which is best suited to our needs as employees of our company. Certainly, there are many areas where we have pioneered in fringe benefits in our industry. For example, I know of no one who does not envy us our week-long Christmas holiday. On the other hand, if we look hard enough we can always find some single thing in some other company which we might like to have. The value of a good fringe benefit package does not lie in adopting some benefit at some other company which looks good but may prevent us from getting something which we need more.

The best track athlete is the decathlon champion, like Bob Mathias or Rafer Johnson, who is excellent in 10 events but who may not hold the world's record in any one. Our Northrop fringe package holds a record once in a while in some event (like our Christmas holiday), but it is primarily designed to cover our broad needs as Northrop people and yet put us on a comparable basis with the over-all fringe benefits of our competitors. Our Company has done a remarkable job over the years in providing us with this kind of coverage.

NOW, ABOUT THAT MISSILE...

Jim Hock Likes Placentia and People Who Ask Questions

The lumbering tracked vehicle shuddered to a stop. The driver removed his crash helmet and goggles. The police officer stepped out of his patrol car and took the traditional stance.

The conversation went something like this:

"Was I speeding officer?" "No sir." "Run a stop sign?" "No sir." "Fail to signal a turn?" "No sir." "Then what . . . ?"

"Well, sir, I realize you are the mayor which gives you certain rights," the officer stammered, "but does it entitle you to have possession of a U.S. Army missile vehicle? I'd like to check this out, if you don't mind."

Mr. Hock

A few quick radio calls verified the driver, and mayor of Placentia, California, was en route to a remote Santa Ana river bed area to test the Hawk missile loader in his capacity as a Northrop Nortronics (Anaheim) Ordnance Laboratory test engineer.

James W. Hock, Northrop 18-year veteran, was the driver-mayor-test engineer. And the police officer's interest pleased him.

Jim Hock has a reputation as a question asker. In fact, fellow citizens and city officials dub him as the "Number one question asker in all of Placentia."

"Sure I ask questions, lots of them," Jim Hock admits. "It is a wonderful way to learn and I've never met a man who could not teach me something. Questions make this possible."

Jim Hock is a remarkable contrast to the stereotyped "politician." He'd never dabbled in politics when he moved his family to Orange County in 1953 and resettled three years later in Placentia.

First, the interest of fellow Nortronics employees living in the community prompted him to accept a two-year appointment to the Placentia Planning Commission. His wife, Peggy, accepted a similar post on the Parks and Recreation Commission.

In 1960 Jim Hock was a successful candidate for a four-year City Council post. This group named him mayor for one year (filling out a term), then returned him to a full two-year term. Last year he was elected to serve another four-year City Council term (running to 1968).

Placentia was a sleepy little community of about 3000 when the Hock family moved there. It now has 16,000 residents in a five-square-mile area bordering Anaheim, Fullerton and Yorba Linda.

Jim Hock is justly proud of the city's progress in this short span of years. It has built parks and set aside land for others; turned its firefighting unit from volunteers to a full-time staff of 16 with two stations; and increased its police force from five members to 20. Naturally, there have been other advancements, industries brought in, etc.

However, the community remains primarily a residential area predominantly higher in income and education than the average area of comparable size.

"Our citizens know what they want, and do not want, in a community," Jim says. "And they are active, very active, keeping elected officials on their toes at all times."

Placentia is conscious of its heritage, dating back to Spanish land grants of the mid-1700 era.

(See PLACENTIA, page 5)

Parachute Recovery Of Boosters Outlined

Technical problems involved in recovery of big boosters of the Titan, Saturn and post-Saturn eras have been solved or are now within the state-of-the-art, according to Theo Knacke of Northrop Ventura's technical staff.

The big question facing developers today is: "When will re-use of boosters requiring a full-scale recovery program become economical?"

Since the booster itself accounts for only 30 percent of the total launch costs, Northrop Ventura cannot answer the question about re-use economies, Mr. Knacke said recently.

"All of our studies since 1960 have been made with a clear understanding that recovery is an important—but only a part—of a complex re-use cycle," he continued.

"Such cost parameters as recovery operations, refurbishing of the vehicle, number of launches possible with the same booster, re-use reliability, range operations, turn around time, cost of upper stages, and many others must be considered as well."

The Division is assuming, however, that the $30 million cost of the Saturn 1B booster, which is programmed for Apollo and future space station missions, will tip the economic scales in favor of recovery, if the booster can be re-used three to four times. Similar considerations apply to Titan, Minuteman, and the big solid strap-ons used on Titan 3C.

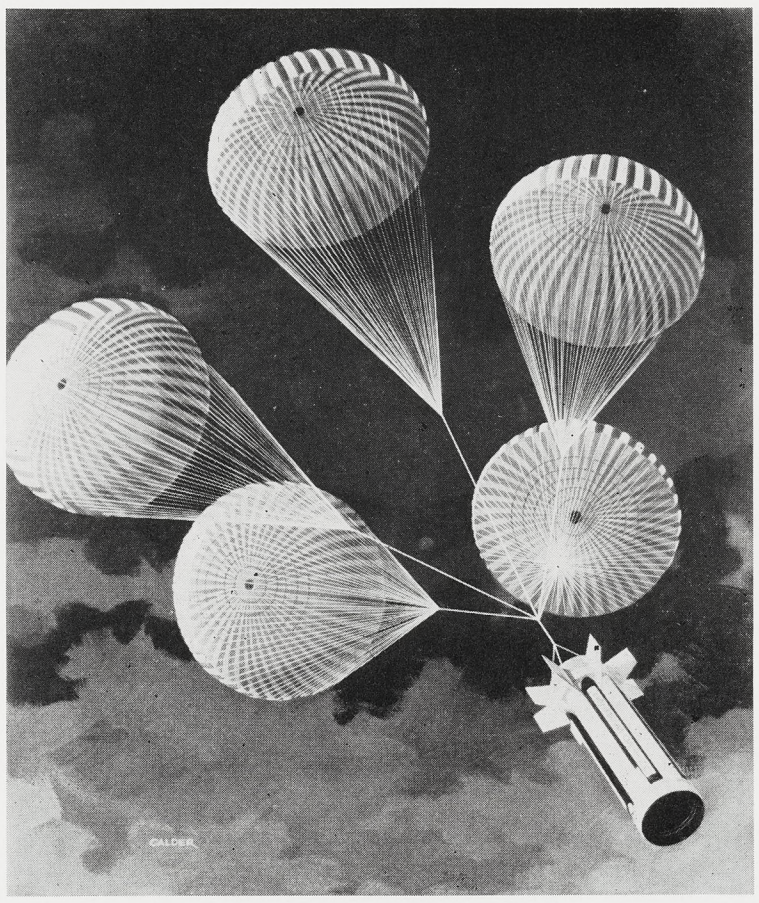
This is in line with other studies made by booster manufacturers, DOD agencies, NASA-Marshall Space Flight Center at Huntsville, Alabama, the responsible agency for the Saturn program.

The proposed Northrop recovery system normally includes a cluster of large final-tested parachutes, for example, five 205-foot diameter Ringsail parachutes for Saturn S1B for final landing. Supersonic deceleration is achieved by a single high Mach, heat resistant drogue chute.

Also under study at present is the use of steerable parachutes which not only could land at predetermined locations, but could land in the same direction as wave movement to reduce the possibility of impact damage.

It has been found feasible and practical by Northrop studies for steerable parachutes to be used in guiding spent military boosters of lesser weights to a safe dry-land area when fired from inland missile sites. This will avoid damage to life or property in the overflown areas.

"Again," Mr. Knacke emphasized, "it is not a question of recovery alone. But when NASA and DOD decide that the complete re-use cycle offers a decided cost advantage to the space program, we have the technical capability to provide a re-entry stabilization and parachute recovery system in a very short time."



REAL MONEY SAVERS—Artist has depicted how Northrop Ventura recovery system, made up of five 205-foot diameter Ringsail parachutes, could lower Saturn S1B booster to ground for possible re-use after flight. Also under study at Ventura is steerable parachute concept to land military boosters.

Sea Maid Ship Wins Second Canoe Event

The Sea Maids, NRC-sponsored Mariner Girl Scout ship, have chalked up some impressive laurels in the weeks just past.

August 21 the girls entered the annual Southwest Canoeing Association championship trials held at Cabrillo Beach, San Pedro, and walked away with their second straight over-all championship.

The NRC girls garnered sufficient points in such events as slaloms and racing, to take the first-place honors and trophy for the second straight year. Entered were some of the top canoe groups in the area.

September 18 the Sea Maids performed numerous exhibitions in canoeing, water safety, etc., as part of Scout Day at the Los Angeles County Fair held at Pomona.

Now nearing their 14th year of operations under NRC sponsorship, the Sea Maids have established themselves as among the top Mariner troops in Southern California by their performance, skills and public service activities.

Square Dance Club Schedules Lessons

A new series of beginning square dance lessons for adults is being planned by the Square Jets, NRC-sponsored square dance club.

The initial session meets at 7:30 p.m. October 21 at Hill Rancho, 15701 Crenshaw Blvd., Gardena. Subsequent classes meet at the same time and place and on the same night for two additional weeks.

VISITORS FROM SEVEN NATIONS BRIEFED ON NORTHROP ACTIVITIES

Graphic indication of Northrop's growing international commitments was evidenced last month in its visitors from other nations.

During September, Northrop was host to military, governmental or industrial representatives from seven nations — Turkey, Canada, Italy, France, Belgium, Holland and Japan.

A majority of the visitors were on hand for F-5 tactical fighter discussions, while others called for plant tours or general briefing at Norair Division.

General Pierre Valroger of the French Air Force, who is also director of the French National Institute of Aeronautics, headed a delegation of officers from that nation. The group representing the Italian Air Force was led by Brigadier General Emanuel Annoni.

Squadron Leader J. Dardier of the Royal Canadian Air Force and Flight Lieutenant Terry Thompson of the same organization also visited Norair.

NRC Toastmasters To Present Awards

Tomorrow night, October 7, will be a big occasion for NRC Toastmasters with installation of officers, presentation of annual awards and ladies night all rolled into one.

This event is scheduled for 7 p.m. at the Cockatoo Inn, Hawthorne.

Officers to be installed are: Ron Klein, president; Carl Peace, educational vice president; Pat Patton, administrative vice president; Vern McNaughton, secretary; Joe Palys, treasurer; Dave Bean, sergeant-at-arms; and Elmer Davis, NRC commissioner.

Trophies will be presented to Dave Bean, George Benoit, Allen Burns, Elmer Davis, Doug Johnson, Ron Klein, Dick Lee, Larry Madden, Vern McNaughton, Carl Peace, Don Smith and Dick Williams.

In a recent competitive event with the Westchester Toastmasters, the NRC group garnered two of three trophies. Walt Darby and Pat Patton received the awards.

Interest earned from your investment in U.S. Savings Bonds is not subject to state or local income taxes. Federal tax on E Bond interest may be deferred until you cash the bond.

Idea for Cutters Pays $427 Under Suggestion Plan

Roy Dennis knew he had a good idea, went out of his way to prove it, and pocketed an extra $427 for his efforts.

The $427 was an Employee Suggestion award payment.

Mr. Dennis is an alert precision router in Northrop Norair's Chem-Mill and Hydraulics function. He works frequently with chem-milled magnesium parts, such as T-38 and F-5 doors, panels, etc.

Like others in his section, Mr. Dennis noted how extremely tough magnesium often wore out as many as three conventional router cutters in performing trimming operations on a single part. He worked out a possible solution in his mind, but needed to verify it.

That's when Mr. Dennis heard the Norair Model shop has attained a limited quantity of solid carbaloy cutters. He went to a tool crib in that area and obtained permission to try the new cutters in chem-mill operations.

He immediately found his verification. The carbaloy cutters could cut as much as 25 times the distance as conventional cutters. In addition, they cut faster and produced a smoother finish, greatly reducing hand work in filing and burring.

Mr. Dennis suggested that Norair change router drills for this particular operation and won his $427 award based on savings from faster cutting and reduced file and burr time for finished parts.

NRC Deep Sea Derby Scheduled Saturday

Northrop's Deep Sea Anglers will stage an NRC-sponsored Deep Sea Derby, Saturday, October 9.

Sign out will be at 4 a.m. or later with sign in no later than 2:30 p.m. Weigh in will be at either Norm's Landing Tackle Shop, San Pedro, or the Tackle Shop at the Redondo Beach Boat Hoist.

Entry fee is $1 per fisherman and must be paid by noon Friday. Prizes will be awarded for at least three fish, possibly more if entries warrant, according to Stan Collins, NRC commissioner.

Awards will be presented at a regular Deep Sea Angler meeting to be held at 7:30 p.m. October 19 in the NRC Clubhouse, Hawthorne.

IN SPACECRAFT FIELD

NSL Perfects Design, Manufacturing Capability

In developing the first Northrop-built orbiting satellite systems—FESS and the OV2 series—Northrop Space Laboratories has also perfected a highly-efficient spacecraft design and fabrication capability.

This capability has not only turned out NSL's first hardware, it has also been tailored to handle present and future requirements in this field.

FESS work began at NSL in 1963.

At that time NSL was in its organizational stages. Thus, incoming personnel, each skilled in a particular field, was afforded a rare opportunity to "grow" with a particular development item.

Among the initial steps taken was the clear definition of work to be performed by each function. For instance, Systems Engineering under Director George Mueinch was organized so that all electronic systems fabrication fell to the Spacecraft Development Laboratory, a part of Electronics headed by Bob Mann. Other subsystems, structural and mechanical efforts centered in the Thermodynamics-Propulsion-Structures group headed by Harry Hotz, with the new NSL Manufacturing group under General Foreman Len Maurer providing manufacturing support.

FESS developmental efforts were carried out on a more or less team basis with all men handling special assignments as necessary. Techniques learned and experiences led to the current methods employed in the OV2 series. That is, each specific subsystem was assigned to cognizant engineers and their staff to carry through.

While both FESS and the OV2 series have been developed largely through NSL efforts, both Northrop Nortronics and Northrop Norair have assisted in the programs.

"We have learned a lot in our development of these satellites," says Bob Mann, "and we are applying this knowledge to our plans for future work."

Mr. Mann also pointed out that while the satellite development work had occupied a majority of personnel assigned to this work, many other projects and programs were carried out at the same time.

Among key people assisting in the satellite electronics work under Mr. Mann are Bill Coop, Tom Fall, Ben Russell, Larry Dietz, Art L. DeBolt, Frank Lucca, Dr. Frank Chen, Joe Votaw, Pate Webb, Curt Addington, Bunky Ayers, Jack Humphreys, Dick Moore, Ted Weber, Mark Anderson, Ed Burt, Bill Ellern, Joe Palys, Bob Barber, Mary Furcron, Dick Homesly, Mitz Imamoto, Jim Kohan, Lois Pallatin, Ellen Peebler, Rich Petros and Tom Roberts.

Among key Manufacturing employees on the programs under Mr. Maurer are Keith Coy, Glenn Hagen, Norman Bailey, Lynn Kauffold, Marty Rojas, and about 10 topnotch machinists, mechanics and sheet metal workers, each with an average of 22 years in the aerospace industry.

Key people in structure and mechanical design under Mr. Hotz on the OV2 series are Fred Gibbs, Jack Behm, Don McLain, Herb Harris, Harry Lewis and Leo Honekamp.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

VW, Sunroof, 1963, $1250. Long Bch., 596-1280. A

Piano, Spinet, Shoniger, oak, $475. L.A., 645-2665. A

MGA, 1958, custom paint, top, & tonneau cover, r/h, $975. Playa del Rey, 398-1458.

House, 1,500 sq. ft., 3-bdrm., 1¾ bath, 2-level, playroom, dishwasher. elec. or gas kitchen, $34,950. Playa del Rey, EX 1-4860.

Honda 50cc, 1963, $125. Lakewood, 867-3367. A

Pups, boxer, AKC, fawns & brindles, $75 & up. Redondo Bch., FR 8-4676. A

Monza, 1965, low mileage, 4-spd., stick shift, $100 for equity & take over $84 mo. payments, $2200 bal. El Segundo, EA 2-3254. A

Figure Ice Skates, w/guards, boy's size 6, used once, $10. Torrance, FR 8-1350. A

Boat, Ford V-8 85 hp motor, lge. wheel trailer, rope, ski, $600. Hawthorne, OS 6-4503. A

Chevrolet, Impala, 1965 SS, all extras, factory air, $3100. Gardena, DA 9-6848. A

Shopsmith, complete incl. jointer, $180. L.A., PL 7-7911. A

Ford, 1956 sedan, near new tires, brakes & battery, recently o/hauled, p/s, $325. Buena Pk., TA 8-2857. A

Drafting Machine, Bruning model 2699, 24″ x24″ arms w/18″ plastic blade, $50. Inglewood, OR 7-9303. A

Chevrolet, 1961 2-dr. sedan, stick shift, 6-cyl., 55,000 miles, $550. Inglewood, OR 4-6386. A

Corvette Stingray, 1963, hard & soft tops, r/h, 4-spd., 4:11 posi., Hayes clutch, Jardine headers, $3400. La Habra, 691-9534. A

Morgan SS, 1960, TR eng., Nardi steering wheel, r/h, $1495. Santa Ana, LI 4-6135. A

Piper PA 16 Clipper, tan & white, less than 1000 hrs. A & E, omni., $2000. Whittier, 213-944-3776. A

Plymouth, 1956 station wagon suburban, r/h, new tires, $100. Inglewood, 672-2315. A

Mobile Home, 1962 Crusader, 60′x12′, factory air cond., 30x8 porch, alum. awning, car port, $8900. Torrance, DA 5-3649. A

Chevrolet, 1954, 2-dr. sedan, r/h, new tires, orig. owner, $250. Redondo Bch., FR 6-6415.

Harley 74 FLH, 1965, 1700 miles, $1650. Gardena, 679-3927. A

Dining Room Set, Duncan-Phyfe mahogany, lge. silver chest & high-boy, $75. L.A., AX 2-6909. A

Karmann Ghia, 1960, new eng. & access., 1964, new paint, good tires, $950. Van Nuys, 786-4742. A

Chevrolet Impala, 1964, SP convt., r/h, record player, 327 eng., 4-spd. trans., $2400. La Habra, 691-0106. A

House, 2-bdrm., 1 bath, patio w/built-in bar-b-que, near grade school, int. recently painted, $16,000. Torrance FR 1-0629. A

Golf Clubs, Sam Snead champ. quality, irons 2-9 & wedge, woods 1-4, head covers, bag & cart, $150. Hawthorne, OS 5-3711. A

Guitar, elec. Melody, w/med. size magnatone amplifier, $150. Rolling Hills, 833-9747. A

Apt. Units, 5 deluxe, 2200 sq. ft., owner's unit sep. f.a. heat, 3 bdrms. & family rm., $67,500. Hawthorne, OS 5-3792. A

Porsche, 1954, $1100. Manhattan Bch., 374-3365. A

Refrigerator, 1956 Westinghouse, cross top freezer, $65. Portuguese Bend, FR 7-5370.

Outboard Motor, Johnson 30 hp, new power head, $125. Hawthorne, 676-1441. A

Stereo Hi-Fi Components, AM/FM tuner, dual amplifiers, dual preamps, 4 speakers, stereo turntable, complete, $66. Hawthorne, 676-0418. A

Dining Room Set, oak, table extends to 90″ 5 chairs, 1 arm chair, buffet, $50. Box 1701.

Air Conditioner, RCA Whirlpool, 7000 btu, auto. temp. control, 3-spd. fan, outside/inside air control, $100. Miraleste, 547-2870. A

Air Cooler, 26x18x17, water circulating-type, 3-spd., used once, $45. Rolling Hills Ests., FR 5-8778. A

Ski Boat, 18′, trailer, Chrysler eng., Gibson hull, many extras, $3000. Norwalk, UN 5-8863. A

Refrigerator, crosstop freezer, $20. Gardena, 757-2383. A

Scooter, Cushman, buddy seat & windshield, $120. L.A., 645-2523. A

Surfboard, Bing, $30. Hawthorne, 671-2069.

Sofa Set, 8′, brown & aqua w/club chair & ottoman, $125. Hollywood, 876-8712. A

Sprite, 1959, w/tonneau cover, $600. Inglewood, 673-3369. A

For Sale

Bed, hospital-type, mattress, side rails & elevates head, feet & legs, $45. Long Bch., 422-4740. A

Impala sport coupe, 1961, r/h, auto., p/s, p/b, other extras, orig. owner, $1375. Long Bch., 423-7635. A

TV, 17″ Hallicrafter, w/gold stand & magazine shelf, $40. Redondo Bch., 374-6684. A

Piano, Lighle & Co., upright, dark oak, $195. Torrance, FR 5-8804. A

Rambler American, 1960, 2-dr., r/h, near new tires, 1-owner, $525. Hawthorne, 644-1572. A

Dinette Set, chrome, w/extra leaf & 4 matching chairs, $15. Hawthorne, OS 5-2514. A

House, 1 mile to Research Pk., 4-bdrm., family rm., 2 baths, built-ins, patio, fenced yd., near schools, $41,900. P.V. Pen., 377-5172. A

Piano, upright, recently refinished, $125. Compton, NE 8-0116. A

TV, RCA 21″, color UHF, wood cabinet, $375. Hawthorne, 675-9476. A

Motorcycle, Yamaha, 1964, 125cc, elec. start, $350. Torrance, DA 6-7528. A

Bunk Beds, dbl., wagon wheel, $10. Torrance, FR 5-4574. A

Range, Kenmore, 4-burner, gas, 2-yrs.-old, stainless top & glass, $75. Huntington Bch., 714-842-1781. A

Austin Healey Sprite, 1959, head rests, AM radio, $850. Hawthorne, 675-9540. A

Camera, Argus C-3, 35 mm, flash & case, sun shade & filters, $25. Harbor City, 326-1856. A

Chevrolet Impala, 1964 2-dr. h/top, p/s, p/b, r/h, w/s/w, low mileage, $2295. Hawthorne, OS 9-2122. A

Divan Set, tangerine Naugahyde, $70. Torrance, 320-2002. A

Plymouth, 1964, 2-dr., p/s, p/b, auto. trans., 383 cu. in. eng., $2300. Redondo Bch., 374-2915. A

Cocktail Table, $10. Granada Hills, 324-1494.

Horse, Morgan mare, black, 8-yrs.-old, $300. Torrance, DA 9-2016. A

Muffler, stock, off 1964 VW w/chrome tips, $7. Torrance, 371-8939. A

Organ, 30-chord Silvertone, $90. Inglewood, OS 5-4905. A

Ford Country sedan station wagon, 1957, $400. P.V. Ests., FR 5-5097. A

Pontiac, convt., 1964 Catalina, auto. trans., r/h, power, many extras, $2295. Santa Monica, 393-7464. A

Swimming Pool Filter, Romar, w/skimmer & instructions, 2 cartridges, filters 1100 gals. hr., $20. Torrance, 323-4257. A

Stove, O'Keefe & Merritt contemp. model, clock, timer, meat thermometer, $250. Lawndale, 676-3050. A

Coffee Table, mahogany, $10. Torrance, FA 8-4243. A

Bicycle, 10-spd. Derailleur, $35. Torrance, FA 8-6567. A

Sailboat, 14′ Satellite Omega class, spare center board & boom, beaching rudder, dacron sails, trailer, $400. Redondo Bch., FR 5-8938. A

Edger, push-type, red, $2.98. Gardena, 329-9484. A

Camera, Polaroid J-66, w/case, $45. Cypress, 828-9075. A

Kitchen Set, chrome, Formica top, table leaf & 4 chairs, $15. Hawthorne, 679-4365.

T-Bird, 1955, all powered, auto. floor shift, $1075. Inglewood, 673-0752. A

Ice Cream Set for patio or breakfast room w/table, arm chair, & 3 std. chairs, $90. San Pedro, TE 3-9455. A

Mercury, 1954, h/top, 56,000 act. miles, 1-owner, r/h, $200. Gardena, DA 4-5341. A

Chevrolet, 1962, 327 cu. in., AFB, Hurst 4-spd., 4.88's, chrome rims, Caslers, $1500. Redondo Bch., 379-9897. A

Apt., 3-bdrm. town-house, 2½ baths, dble. attached garage, pvt. laundry facilities, close to shopping & bus line, $30,500. Inglewood, 674-2371. A

Volkswagen, 1963, chrome wheels & hubs, radio, headrests, $1400. Buena Pk., 714-828-0268. A

Yamaha, 1964, 80 cc, rebuilt eng., good tires, $275. Gardena, 324-8450. A

Home, rustic charmer, 3-bdrm. or 2-bdrm. & convt., completely redecorated, fireplace, covered patio, dble. gar., carport, blockwall fence, $23,500. Hawthorne, OS 6-1985, DA 9-5126. A

Cabin Cruiser, 25′ Esseness, 9½′ beam, fiberglass, 2 inboard engines, $2000. Lawndale, 371-7311. A

Bicycle, 26″ girl's Schwinn, $15. Inglewood, PL 6-7337. A

Organ, Baldwin model 40 Orga-Sonic w/percussion; Philippine mahogany w/matching bench, $695. Redondo Bch., FR 5-3914. A

Organ, Hammond chord, blonde w/percussion, will deliver, $350. P.V. Pen., 378-2369. A

House, 3-bdrm., 2 baths, lge. fenced yard & patio, near schools & park, kitchen built-ins, paneled bedroom/den & dining room, forced air, $23,000. La Mirada, 714-521-1516. A

Home, custom-built, 3-bdrm., 1¾ baths, built-ins, garden w/fruit trees, close to Northrop, $28,000. Hawthorne, 675-8829. A

Violin & carrying case, music rack, slide mute, chin rest, $80. Santa Ana, 549-2763.

Frigidaire, 1954, will guarantee 6 mos., $30. Long Bch., TE 4-7823. A

Saddle, lightweight western style, used a few times, light tan, horsehair pad, $50. Inglewood, 672-3802. A

For Sale

Apt. Bldg., deluxe 9-unit, 3-bdrm. owner's unit, yearly income of $12,500, $107,500. Torrance, 325-9832. A

Corvair, 1964, r/h, 110 hp, $1350. Hollywood, GR 8-3232, OL 6-3475. A

Acreage, lake frontage in No. Calif., 2 2½-acre parcels, $5750 parcel; 2 5-acre parcels, $9500 parcel. $500 down, 1% per mo. pymts. L.A., 476-1635. A

Bicycle, girl's, full-size, middleweight, blue, $15. Rolling Hills, FR 8-1863. A

Tools, 1″ to 2″ mike, 2″ to 3″ mike, (2) 24″ scales & adjustable parallel blocks, $35. Gardena, DA 4-8853. A

Jeep, 1942 CJ2A Willys, windshield, $35. Torrance, 320-5846. A

Volkswagen, 1963, r/h, 2-dr. sedan, vinyl int., $1225. Hawthorne, 676-6134. A

Motorcycle, 1965 Triumph TR-6, $900. Inglewood, 674-1847. A

Volkswagen, 1965, sedan, 400 miles, warranty in effect, $1700. Fullerton, 714-871-5510. A

Chair set, 2, aquamarine, on casters, $50. Inglewood, OR 4-7743. A

Lots, 2 level, running springs, Deep Creek Lake area, ½ dn., terms, $3200. Diamond Bar, 714-595-3013. A

Washer, Kenmore auto., 2-spd., 10 cycles, $75. Torrance, 371-6328. A

Desk, solid maple, roll-out typewriter shelf, built-in bookshelves w/chair & fluorescent light, $150. San Pedro, TE 3-7306. A

Water Skis, children's dble., used once, $20. Lawndale, 675-0189. A

Wanted to Buy

Bicycle, Stingray, for small boy. San Pedro, TE 3-2512. B

Dress Form, size 14, Box 1702. B

For Trade

Winchester, model 12, 12 gauge will trade for Winchester model 12, 20 gauge. Whittier, 943-1361. C

FREE (To Be Given Away)

Windows, 3 dble. hung. Hawthorne, OS 6-1018. D

Rentals Offered

Duplex, 2-bdrm., free soft water, $125 mo. Hawthorne, OS 5-3866. E

Apt., 1-bdrm., furn., pvt. deck, lge. pool, sub. garage, near Northrop, $145 mo. Lawndale, 377-4372, 679-7426. E

House, 3-bdrm., dble. garage, fenced yd., water & trash paid, no pets, $145 mo. Lawndale, 371-6775. E

Condominium Apt., 4-bdrm, 2½-bath, heated pool, play equip., quick freeway access., lease, $315 mo. Rolling Hills Ests., DA 5-5609. E

Apt., 1-bdrm., deluxe, built-ins, pool, $95 mo. Redondo Bch., 376-2117. E

Apt., 2-bdrm., closed gar., all extras, 10 mins. to Nortronics P.V., encl. yd., $110-$125. Torrance, 375-9397. E

Duplex, 2-bdrm., h/wood floor, gar., water paid, $125. Hermosa Bch., 376-3857. E

Apt., 2-bdrm., walking distance to Northrop, 2 bath, exec.-type, $125. Hawthorne, 676-9620. E

Apt., 2-bdrm., large, newly decorated, pool, $125 unfurn.; $140 furn. L.A., VE 7-4036. E

House, 3-bdrm., 1 child OK, $137.50 mo. Thousand Oaks, 495-3623. E

Apt., 2-bdrm., unfurn., enclosed gar., $87.50. Torrance, 373-1266. E

House, 3-bdrm. & family room, fenced yard, car port, children OK, walking distance Plt. I, $135 mo. Hawthorne, OS 6-6104. E

Cabins, Lake Gregory & Crestline, sleeps 6, $25 weekends, $60 wk. Venice, EX 1-2040.

Apt., 1-bdrm., unfurn., modern, refrig., air cond. 20 min. to Norair, $97.50. Mar Vista, 391-7781. E

Apt., 3 & 4 bdrm., open-beamed ceilings, fireplace, patio, air cond., 2 baths, many extras, from $125. Anaheim, 638-2877. E

Apt., furn., open gar. w/storage space, laundry facilities, 2-bdrm., 2 baths, water paid & trash, $140 mo. Inglewood, 672-5798. E

Rentals Wanted

Secretary willing to share furn. 2-bdrm. apartment w/1 girl. Inglewood, OR 1-5242.

Personals

Ironing in my home, 2 blocks from Eng. Science Ctr. Hawthorne, 675-8388. L

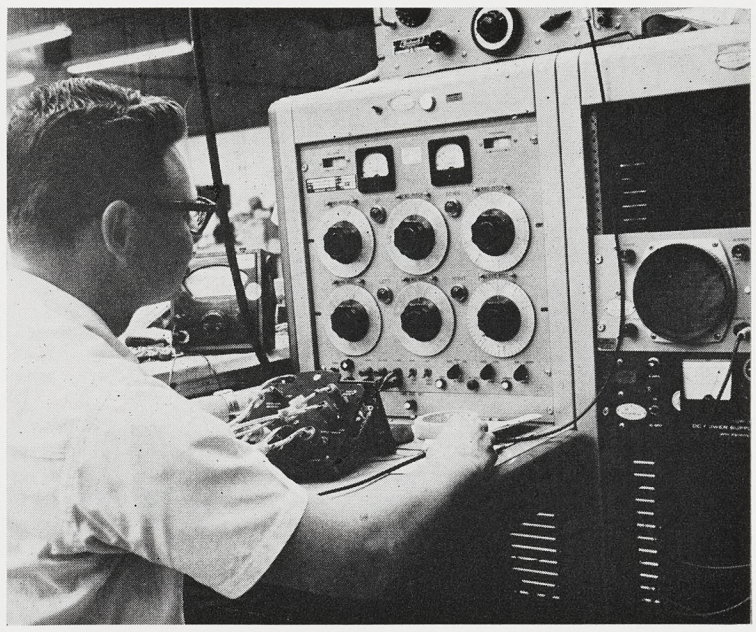
My Family & I wish to thank each & everyone of our dear friends at Northrop Norair who so warmly donated to the Heart Fund, the Physical Handicapped, flowers, Mass cards & personal letters in my husband's memory. We thank you. MRS. JOHN B. CLARK L

We wish to thank all Northrop people for their kindness during our bereavement in the loss of our son. V. E. FINNEGAN & FAMILY. L

For Sale or Trade

Refrigerator, Crosley-Shelvador, 11½′, $25 or trade for camp cots & sleeping bags. Torrance, DA 6-5558. M

Chevrolet, 1956, auto. trans., '64 Chev. interior, good tires, $625 or trade for Volkswagen. Montebello, 722-7680. M



Work for Ventura includes production of decoder units which fit into drone radio control systems. Inspecting unit, Jack Mildon simulates command such as roll or pitch and makes sure it responds according to specifications.

INSTRUMENTS: Aero Offers Good Switch Without a Fight

(Continued from page 2)

and moving shutters, the device is about six inches long and weighs less than a pound. It can provide output signals to customer requirements without external amplification. Unlike potentiometer transducers, it operates with almost a total absence of friction, and it is not susceptible to overstress as is the strain gage type transducer.

In its application for the Maxson drone, it is used as an altitude sensing device for pressure altitudes up to 80,000 feet. The transducer can also be applied to measurement of temperature, acceleration, loading, force and displacement.

The design was brought to fruition during 1964 by Dick Hauer, instrument research engineer. Mr. Hauer, with the assistance of other technical personnel, brought it through development to the hardware stage.

The frequency converter, initially designed to meet the requirements of a Navy specification was also accomplished by Dick Hauer. The converter utilizes solid-state electronics and can be packaged to attach to standard meter movements.

When Ed J. Illes, Marketing manager, joined the facility in 1964 he increased the sales network. Agreements with 17 manufacturing representative firms, utilizing some 35 engineering sales representatives, were established.

Mr. Illes points out that the market for transducers is a multi-million dollar one — 60 million dollars for pressure transducers alone. In addition, the pressure switch market totals $20 million annually. The market for frequency meters, running time meters and frequency converters provides a note of stability that any firm desires. And Aero is reaching out for a bigger portion of these markets.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m.—3:45 p.m.

Western & Lomita Blvd., Harbor City. L. A. Pendleton, Norair, ext. 2006, 325-9264 2

Herrin & 1st St., Manhattan Beach. Elizabeth A. James, Norair, ext. 2075, FR 2-4762. 2

7:30 a.m.—4:15 p.m.

Van Ness & Redondo Beach Blvd., Gardena. Sandy Gostel, Norair, ext. 2401, 679-4269. 3

Manchester & Prairie Ave., Inglewood. D. W. Jurs, Mariposa, ext. 4121, 4122, OR 4-2672. 3

8 a.m. — 4:45 p.m.

Brookhurst & Garfield, Huntington Beach. Margaret J. McKenzie, Nor. Anaheim, ext. 651, 962-4903. 5

Compton Blvd. & Crenshaw, Gardena. M. L. Elliott, Norair, ext. 1712. 5

Carson & Avalon, Torrance. S. A. Sickler, Norair, ext. 4221. 5

Fairview & La Brea; La Brea & 64th, Inglewood. Louise T. McCulloch, Norair, ext. 2042, 672-2434. 5

Blossom & Mathews, Redondo Beach. Sue Dahlvang, NSL, ext. 720, 372-9585. 5

Hoover & Melrose, Los Angeles. J. F. Low or F. Almanja, Norair, ext. 1676, 664-6564. 5

Normandie & 107th St., Los Angeles. Dona Davis, Norair, ext. 1559, 1528, 755-2992. 5

Rides Offered

7:20 a.m. — 4:05 p.m.

Valley View & Chapman, Garden Grove. Will pick up & deliver at Plant I. Kenneth Goldenstein, Mariposa, ext. 4257, 897-2632.

7:30 a.m. — 4:15 p.m.

Crescent & Dale, Buena Park. D. H. Eaglin, NSL, ext. 2655, 2656, TA 8-2857. 13

8 a.m. — 4:45 p.m.

Hoover & Melrose, Los Angeles. J. F. Low or F. Almanja, Norair, ext. 1676, 664-6564. 15

PLACENTIA

(Continued from page 3)

This has led to many buildings following the Spanish motif.

And like other small communities, Placentia has its problems. For instance, encroachment by larger neighboring communities; traffic; thousands of new children; storm drainage problems; planning and landscaping; highways and freeways are all quite important to the community.

"Let's face it. We have an ideal community in an ideal setting," Jim Hock says. "We feel strongly that we can continue to grow and expand along the careful route we have followed in the past."

Chances are, this is just what will happen, thanks to men like Jim Hock who care enough to give of their own time to make it possible.

Jim is not alone among Nortronics Anaheim personnel with a vital interest in Placentia. Many employees live there and take an active interest in all endeavors. Harry Dunskey of Provisioning and Documentation is currently chairman of the Planning Commission, while E. P. Weidner of Configuration Management is a Parks and Recreation Commission member.

EXPLORER POST ADVISORS MEET AT PALOS VERDES

Organization of an Explorer Post with membership drawn from two high schools in the Palos Verdes area has begun by Northrop Nortronics.

The special interest youth group will provide opportunities for some 30 youngsters to become familiar with the inner workings of the electronics and aerospace industries. They will meet twice a month at Research Park, Palos Verdes.

A policy and advisory committee drawn from management and top engineering personnel met at Research Park last week with Mike Hoover, executive scout commissioner, South Bay District, to formulate plans for the new Explorer Post.

Membership will be drawn from Palos Verdes and Rolling Hills high schools.

Annual Ash Dunning Golf Tourney Slated

The third annual Ash Dunning Memorial Trophy tournament will be played October 24 at San Clemente under the sponsorship of NRC at Nortronics Hawthorne. Tee times begin at 10:45 a.m.

Limited to 80 participants, this event is a partner's best ball tournament. However, a maximum of seven strokes difference between partner's handicaps will prevail.

All entries must have established handicaps and records of the handicaps must be in the hands of NRC Commissioner Dick Teel no later than October 20.

Mr. Teel indicated this week golfers from throughout Northrop are welcome to take part in this annual tournament, a tribute to a former friend of golf — Ash Dunning.

AMCEL

(Continued from page 1)

complete confidence," Mr. Jones said, "and they form the nucleus for our long-range growth plans for the company."

Mr. Jones also expressed satisfaction with the Asheville location pointing out that it provides convenient contact with the Northrop Space Laboratories at Huntsville, Alabama, and with several Department of Defense facilities in the eastern and southeastern United States.

The Amcel facilities, comprising some 30 buildings and laboratory units located on a 1300-acre site, has been operated as a Corporate division of Celanese. Amcel has some 400 employees.

Nortronics Anaheim NRC Good Time Table

For enrollment or information on activities listed below, call or contact Personnel Activities, Anaheim, ext. 244.

ART, Ed Mosher
Meet Wednesdays, 7 to 10 p.m., Clubhouse, 1834 Valencia Dr., Fullerton.

BASKETBALL, Don Ross
Seasonal.

BIBLE STUDY, Marvin Wiebe
Meet Mondays and Wednesdays, 11 to 11:35 a.m., Y-1 room 339.

BOWLING, Chet Guzinski
Mixed Fives meet Tuesday evenings. Men's meet Thursday evenings.

BRIDGE, Jack Kirkeby
Weekly meetings.

CAMERA, George Baker
Meet 3rd Saturday, 7:30 p.m., Clubhouse.

COIN, Orville Mitchell
Meet 2nd and 4th Tuesday of month, 7:30 p.m.

DESERT RATS, Larry Anderson
Meet only to plan trips.

GEM & MINERAL, Bob Cornelius
Meet 1st Monday of month for business. Meet Thursday, 7:30 p.m. for working night, Clubhouse.

GOLF, Bob Benedict
Monthly tournament.

GUN, Pat Elliott
Meet 1st Tuesday, 7:30 p.m., Clubhouse. Second Saturday, 9 a.m., Silverado Sportsmens.

RADIO, Paul Staudenmayer
Meet at noontime and after hours, radio shack.

TABLE TENNIS, Jack Flannagan
Meet for play at noontime.

TRAILER & CAMPER, Betty Stage
Monthly campouts.

WOMEN'S, Elaine Steiner
Meet Monday evenings at various places.

GETTING THE WORD

Briefing session held at Nortronics (Anaheim) prior to opening of annual AID-NORAID campaign found this group of volunteers on hand to get the word. Workers later fanned out to carry campaign to all departments. Similar groups performed same services at Nortronics Palos Verdes and Hawthorne.

PACIFIC TARGET OPERATIONS

Flying a Plane Is Least of Their Worries

If you don't mind Labor Day in Korea, Christmas in Okinawa, Easter in Taiwan, Independence Day in Hawaii, and a life of 180 degree turns at 40,000 feet, Northrop Ventura Pacific Flight Operations is a good group to join.

Or if you prefer refueling stops in the midst of a revolution, while rival forces are fighting for the control tower, the same Flight Operations section offers its Latin American swing.

For more details on the former, you might contact Tom Stowe, Gus Nilson or Bill Leese; on the latter, Mike Savino can give a pretty good briefing.

All four men fly Northrop built F-89 jets on yearly rounds of U. S. Army Nike and Hawk missile batteries, where they launch Ventura Division AQM-38A (RP-76) target drones for combat readiness exercises.

And, during peaks of the 10-month tour, the section's director, Dale Johnson, gives up his desk at Newbury Park to help out in the field.

The pilots are part of the Division's target support service which has been in operation since 1955 and which also includes 19 field maintenance experts and a tracking unit which directs the target's flight after it's launched.

The planes are the F-89J, built at Northrop Norair between 1955 and 1958 for the U. S. Air Force. The F-89's primary mission was as a nuclear armed, all weather interceptor.

Where a destructive payload once nestled under each wing of the jet, Ventura Division today fits a 10-foot long, solid fuel rocket, which is radio controlled from the ground.

Mr. Johnson is another F-89 enthusiast, and estimates the Division will keep them in service through 1970. After a stint as a test pilot during World War II, Mr. Johnson joined Northrop in 1948 as an engineering test pilot, and was one of the elite group of pilots who flew the famous Flying Wing bombers on test flights over the California desert.

He flew the F-89 during its research and development stages at Norair.

When Ventura Division was awarded its first contract to provide launch support for its RP-76, Norair provided the pilots and maintenance crews under subcontract. Ventura took over complete responsibility for field support activities in 1962 and the aircraft operation was transferred.

While the day-to-day target launching is routine, the real challenge to pilots is the ferrying operation between Hawaii and Korea in August and from Okinawa to Hawaii on the return trip in May.

While ferrying to the Canal Zone is not as complicated, it's still a test to a pilot's nerve.

One of the refueling stops has been Mexico City. Because of the airport's high altitude (7000 feet), the plane cannot give maximum takeoff performance. And the revolution mentioned earlier actually occurred in Guatemala City while Mr. Savino was en route to the Canal Zone.

Blood Donors Swell Northrop's Reserve

Northrop blood credit with the American Red Cross was increased by 317 pints following a bloodmobile operation at Northrop Norair last month.

First shift employees gave 258 pints and second shifters added another 59 pints in the two-day visit. Next scheduled bloodmobile visit will be December 16.

ARROWS

(Continued from page 1)

five members then) stopped to look around and about 50 yards off the road found their first arrow chippings and part of a head.

The technique for arrowhead hunting is a simple one:

Spread out in a likely area near cliffs, bluffs or buttes, and where pinion trees grow.

Look for chippings.

If you don't see any chippings on the ground within 10 minutes find a different spot.

"Surprising to most people," George said, "we don't dig for arrowheads. They are found on the ground. We start out in low lying areas and walk up hill. The chippings and heads are washed down hill by the rains that fall through the years.

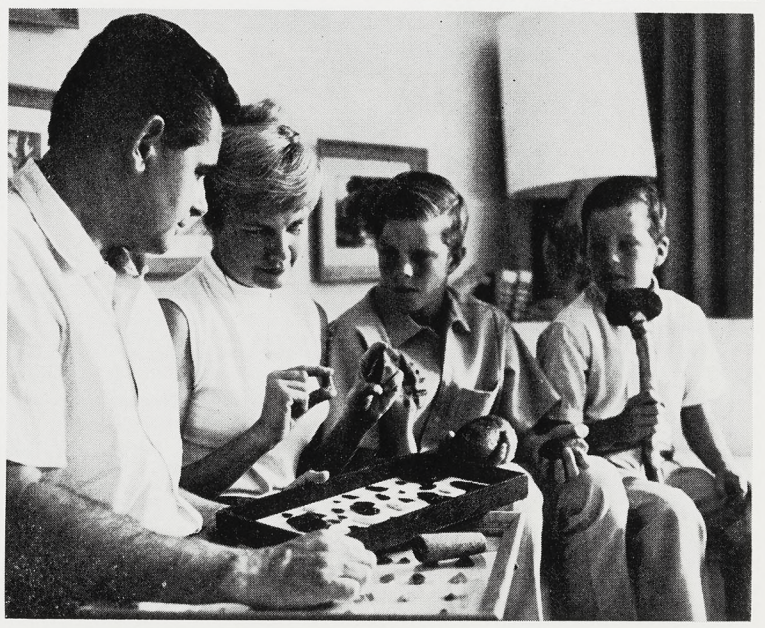
"When you find an arrowhead," he added, "it looks like it was dropped by the original owner ten minutes ago."

Ginny Richards explained that the Indians used obsidian, flint, colored quartz or jasper to make arrowheads.

The Pinto type, found by the family near Little Lake in eastern California, look little different from ordinary black rocks. These were made from volcanic glass, or obsidian.

The arrowheads of the Piutes were found in the eastern Sierra Nevada region and were carefully shaped by expert arrowhead makers of the tribe.

Only with difficulty can modern hobbyists duplicate the craftsmanship of these Indian artisans.



FAMILY AFFAIR—Richards family reminisces over 10 years of arrowhead collecting which has taken them to out-of-the-way places in California and Nevada. From left are George Richards, supervisor, Personnel Administration at Nortronics (Palos Verdes), his wife Ginny, and two of their four sons, Greg, twelve, and Chris, nine.

NORWEGIAN F-5 BEGINS TESTING AT EDWARDS

The first Northrop F-5 scheduled for delivery to the Royal Norwegian Air Force in the spring of 1966 was turned over to a joint U.S. Air Force and Norwegian evaluation team for testing last week at Edwards AFB.

The RNoAF F-5 tactical fighter is scheduled for accelerated service testing and climatic tests through early 1966, with certain RNoAF options, including a tail hook, inlet duct and windshield heating.

Captain Lachlan Macleay, USAF Air Force Flight Test Center pilot, delivered the F-5 from Palmdale to Edwards. He was joined by Captain Per Eckoldt of the Royal Norwegian Air Force assigned to Edwards AFB for this program.

In early 1964 the Norwegian Ministry of Defense decided to equip the Royal Norwegian Air Force with Northrop F-5 tactical fighters, after extensive evaluation of U.S. and other first line aircraft.

Procurement of three squadrons of F-5s are planned for delivery between early 1966 and 1967.

SATELLITE

(Continued from page 1)

world. By placing the OV2-1 aboard the Titan III-C the USAF expects to obtain valuable scientific data as a space research bonus.

The OV2-1 program is one of the first to be implemented with the requirement of utilizing proven, off-the-shelf hardware for subsystems as a means of improving reliability and reducing costs. It is also one of the first satellite programs to be performed under a fixed price contract.

Ballroom Dancing Classes Scheduled

Northrop Recreation Club has scheduled another series of ballroom dancing classes to open October 14 for a 10-week period.

Sessions will be held each Thursday at NRC Clubhouse, Hawthorne, according to Commissioner Mel Allbrandt.

Instruction is broken into three categories with a $5 fee for each category taken. Offered are western swing at 7:30 p.m.; the waltz at 8:30 p.m.; and tango at 9:45 p.m.

Couples or singles are welcome, Mr. Allbrandt said.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 18 | October 20, 1965

Task Force Sets Up Shop at Cape For Apollo Shot

A Northrop Ventura task force has arrived at Kennedy Space Center to provide on the spot technical support of the Apollo earth landing system, it was announced this month by Wes Steyer, Northrop Apollo ELS program manager.

Cary Buhler, Northrop project engineer, heads the force of six specialists who will be responsible for packing, final assembly and delivery of the Apollo Spacecraft 009 earth landing system to North American Aviation's Space and Information Division, prime contractor for the spacecraft.

Spacecraft 009, the first test of the Apollo spacecraft system at Kennedy Space Center, is an unmanned, suborbital flight scheduled early next year. Previous qualification tests have been held at White Sands, New Mexico, and El Centro, California.

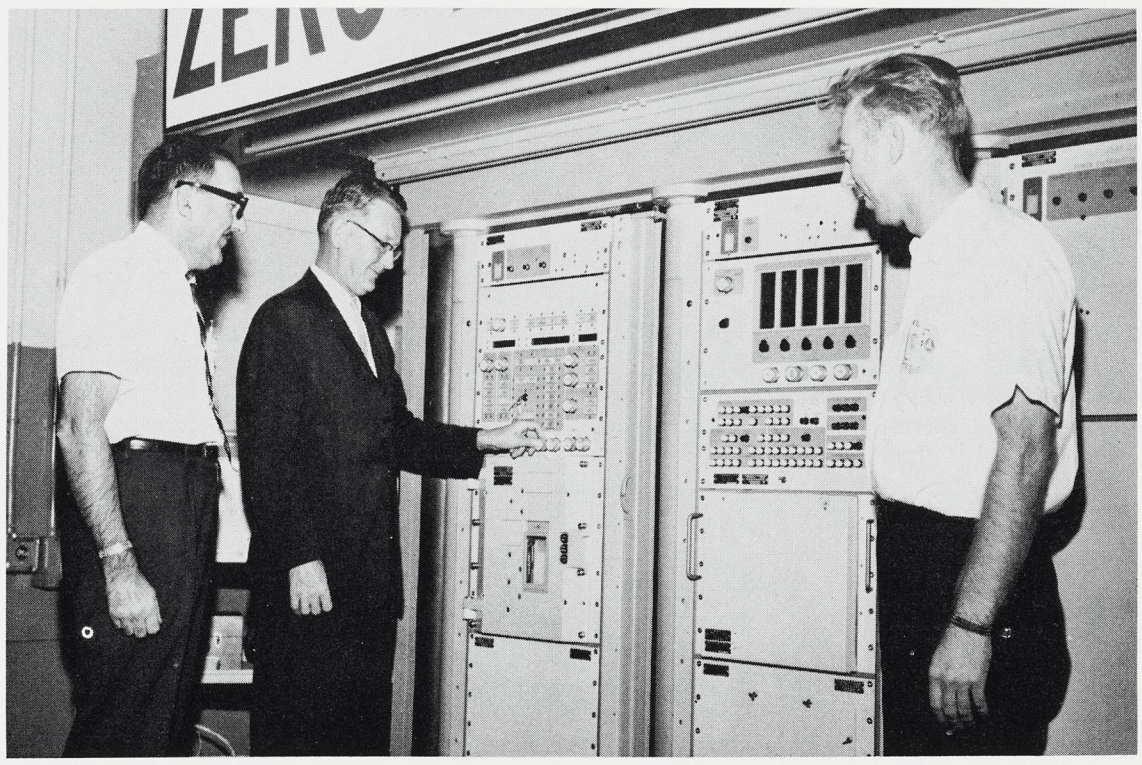
"Owing to the urgent need for completing the parachute packing and end item delivery at Kennedy Space Center within a condensed and exacting schedule, the specialized organization has been established to assure timely and efficient technical support," Mr. Steyer said.

Bowser Installed As President of La Mirada Group

Art Bowser, Machine shop assistant foreman at Nortronics Anaheim, was installed September 30 as president of the La Mirada Toastmasters.

Mr. Bowser served the same group as secretary last term, while Don Koehler, also of the Machine shop, was educational vice president.

Mr. Bowser and Mr. Koehler indicated the La Mirada group is interested in obtaining other Nortronics employees as members. Regular meetings are held at 7 p.m. the second and fourth Thursday of each month at the Jolly Inn, La Mirada. Mr. Bowser will also supply information to those calling him at 525-3816 evenings.



THERE SHE STANDS—Charles Morganti, left, Production assistant foreman, and Oren Williams, right, Production test, watch as William S. Middleton of Quality Control flips switch on final Mark 7 MTRE turned out on long-term production order. Completion was reason for surprise party attended by 250 at Nortronics Anaheim.

250 Production Employees at Anaheim Feted for Years of Work on Polaris

No one shouted "surprise," but the more than 250 Nortronics Anaheim employees admitted later to being just that after an impromptu party held October 1 in their honor.

The only advance notice of the affair was an invitation to gather in the Electronic Subassembly area at the afternoon break.

Only then was the reason revealed — a small celebration at the completion of a final Mark 7 MTRE (missile checkout and readiness equipment) system for the U.S. Navy Polaris program under a production order dating back several years.

For those taking part the party revolved into a time for remembering. A great majority of those present were also present when production work first started on the Mark 7 in the early 1960s. The Mark 7 was then and is now the most advanced MTRE automatic test system used aboard missile carrying submarines. And it represents increased complexity and a capability developed at Nortronics in which they had played key roles in their work assignments.

The party was, in fact, a gathering of men and women who are currently engaged in production work on this and other types of electronic equipment at Anaheim.

The refreshment centerpiece was a baker's masterpiece — a huge cake with deep blue water, lighter blue skies, a submerged submarine and a Polaris missile clearing the water in a wreath of spray. It was served, along with other cakes and coffee.

Frank Lynch, Nortronics vice president and manager of Operations, was on hand along with other top management members.

Chatting informally, Mr. Lynch recalled the early days of the program, its trials and successes. He spoke of the dedicated work performed by those gathered in building quality components well within budgetary

(See PARTY, page 6)

NRC Gem Clubs Set Joint Field Trip

Northrop Gem and Mineral Clubs from Anaheim and Hawthorne will join forces this coming weekend for a field trip to the Boron Castle Buttes area.

The campground gathering point is in an unimproved area with participants required to bring water, firewood, etc.

Principal lapidary materials found in the area are petrified wood and purple agate. Plans call for a giant campfire and special festivities Saturday night, October 23.

Changes Due Now In Savings Plan

An opportunity for participants in the Northrop Salaried Employees' Savings Plan to change the amount of their contributions to the plan is now at hand.

Changes will be based on salaries in effect August 1, 1965, and must remain within the allowable minimum (two percent) and maximum (five percent) ranges.

Changes will become effective November 1.

Change cards for this purpose must be completed and filed with the Personnel office on or before October 22. Cards are available through the Personnel office, Plant One; the Compensation Administration branch office, Engineering Science Center; the Personnel office at NSL; and the office of the Corporate director of Industrial Relations, Beverly Hills.

VIETNAM SQUADRON COMPLETED

The last two of a squadron of 12 F-5 fighters scheduled for Vietnam duty this fall have been delivered from Northrop's Palmdale facility to Williams Air Force Base, Arizona. The complete squadron is now engaged in combat exercises at Williams.

Secretary of Defense Robert S. McNamara last month announced the squadron would be sent to Vietnam to obtain in combat more information to be used in developing tactical air concepts, procedures, tactics and techniques for employment of F-5's in combat.

The program for readying the aircraft for its combat role was described by Norair Vice President Welko Gasich as "one of the most outstanding and dedicated efforts I have seen."

Major changes include an in-flight refueling capability, a camouflage paint job and jettisonable pylons.

One of the most significant aspects of the program, as pointed out by the Northrop Air Force Plant Representative's office, was the accomplishment of the task by Northrop in an unusually short period of time while maintaining production schedules on deliveries to Allied Forces under the Air Force's Military Assistance Program (MAP).

In a statement reporting Northrop's work in preparing the airplanes the AFPRO said:

"To meet this program's urgent time requirements the 12 F-5 airplanes had to be immediately diverted to the project from the company's production line . . . To close the production gap thus created and to continue to meet stringent MAP delivery commitments required a rapidly accelerated manufacturing schedule to be implemented.

"The Vietnam squadron of airplanes has now been delivered to the USAF while other production requirements are being met. These tasks were successfully ac-

(See COMBAT, page 6)

RECOLLECTIONS—Frank Lynch, Nortronics vice president and Operations manager, chats informally with attendees at informal party at Anaheim marking completion of final Mark 7 MTRE under old contract.

RECORD FOR WOMEN

Frieda Mooring: Her First 25 Years

When Frieda Mooring observed her employment anniversary last week she put another entry on the Northrop Corporation calendar of landmarks: she is the first woman to complete 25 years with the company.

Mrs. Mooring

Mrs. Mooring began her career with the Corporation in 1940, the year following its formation. She was the second employee in Accounts Payable, then located in Plant One, Hawthorne. She is still in Accounts Payable, but now as administrative assistant to Jack Bracey, general supervisor of the organization at Nortronics Hawthorne.

Her employment interview was carried out by Claude Monson, then Northrop controller.

"I can't forget my anniversary date," she said, "because of his attitude.

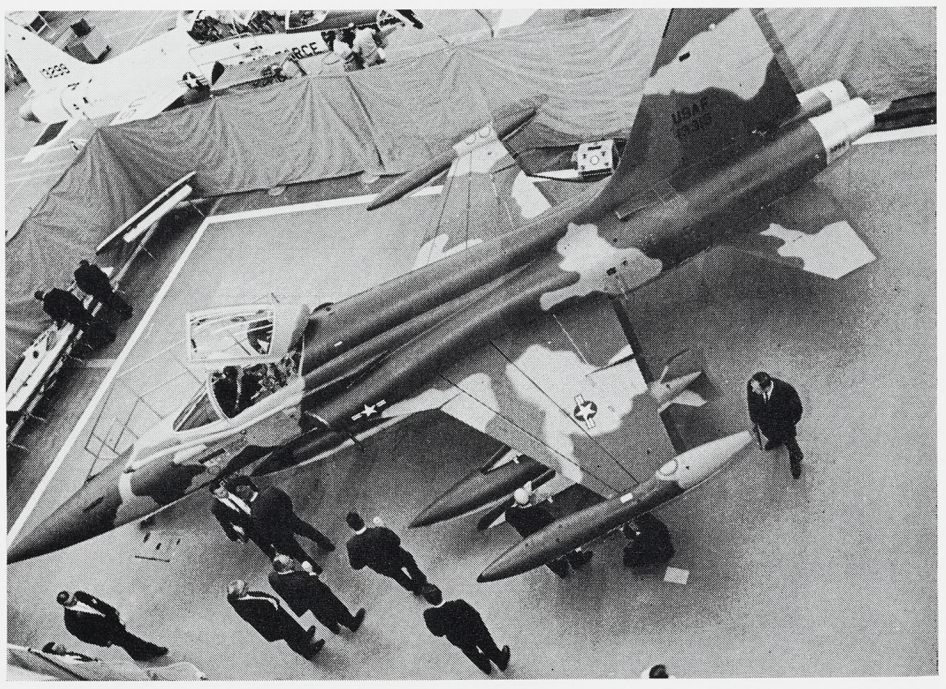
"I came out here initially for a few months, returned to Oklahoma for three months, then came back to California, and Mr. Monson was in some doubt as to whether I would be a very permanent employee."

Mrs. Mooring remembers the influx of accounting work resulting when Northrop acquired its first military prime contract in 1940, less than a year after the company was formed. Northrop was to design and build the N-3PB, a high speed military seaplane, for the Norwegian Government, the same plane that played a major role in the sinking of the German battleship, Bismarck.

In her 25 years with Northrop, she has served under six immediate supervisors and worked at a variety of locations. After Plant One, she moved to the Mode O'Day building in downtown Los Angeles, while the group was expanded during World War II. She moved back to Plant One; to a leased office on Hawthorne Boulevard; to a facility on Maple Street near the International Airport, now known as the Mariposa building; to Research Park, Palos Verdes; to "the barracks" near Plant Two, since torn down; into Plant Two, and finally to her present location in building A-6

(See 25 YEARS, page 6)

Vietnam-bound F-5s have in-flight refueling capability as practice session with tanker jet above indicates. Capability was added during modification effort.



Air Force Critical Design Board goes over F-5 following completion of modifications at Palmdale. Camouflage paint is standard with combat planes for Vietnam.

The People Behind the Story

By BRYAN WEICKERSHEIMER
News Staff Writer

C. B. Nichols, above, lays out job in Norair Advanced Production, where majority of modification parts were fabricated. Dovie Ross, below, answers one of many telephone calls at Palmdale during program. Northrop people did remarkable job readying planes in short time.

A few days ago I received a routine assignment — write a feature story on the men and women responsible for readying a squadron of F-5 tactical fighters for a combat role in Vietnam.

I soon learned there was nothing routine about the subject.

And I must admit my guilt in going overboard in my admiration for an effort like few I have encountered in more than 15 years of aerospace reporting.

Lew Nelson, deputy program manager, gave me my first inkling of something different in a brief outline of the program. Sherm Turner took me further into its scope, extent and depth. He refreshed my memory of a program called Sparrow Hawk in which the F-5 was evaluated under simulated tactical conditions. He explained how this evaluation and a lot of other factors were used to determine the F-5 configuration for the Vietnamese program.

There were 44 modifications to be made. Some were relatively simple. Others were more complex, like adding aerial refueling capabilities, armor plate, and jettisonable pylons.

If there was one factor in the program that impressed me, it was the timing. As talks continued and decisions were made, the go-ahead dates gradually slipped while the ultimate delivery dates were advanced. It was like a noose being pulled ever tighter.

The final authorization was given July 29. The last airplanes were delivered October 11. In any man's language, that is a truly remarkable accomplishment.

Further complicating the matter was the understanding that Northrop would not interfere with its delivery of F-5 aircraft to allied nations.

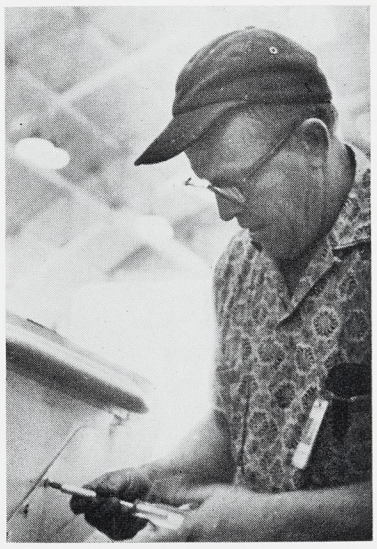
Northrop's Technical organization did a tremendous job in performing engineering work under the able guidance of such men as Will Tebo, John Wolfe, Doug Stephens, Chal Strayer, Al Rosin, Ralph Branning, Roy Merriman, Stan Murnane, Tom Rooney, Carl Weyl and Joe Bligh. Engineering Laboratories replied promptly to assist requirements with Vern Cole, Sherman Lew and Joe Wilson in key assignments.

Fabrication of parts from drawings fell primarily to the Advanced Production and Weld group under Wayne Morrison. This group also supplied technicians to help with modifications at two points. Technicians were also diverted from Manufacturing units under Superintendent Al Carr.

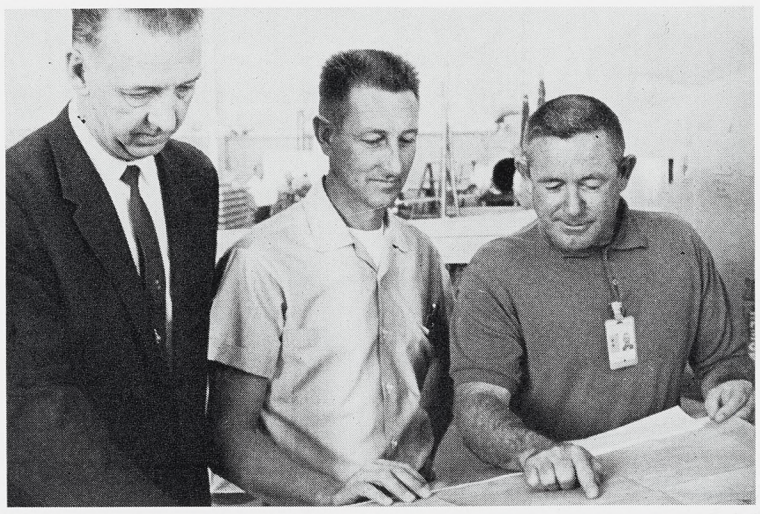
Nortronics Anaheim responded with jettisonable pylon work.

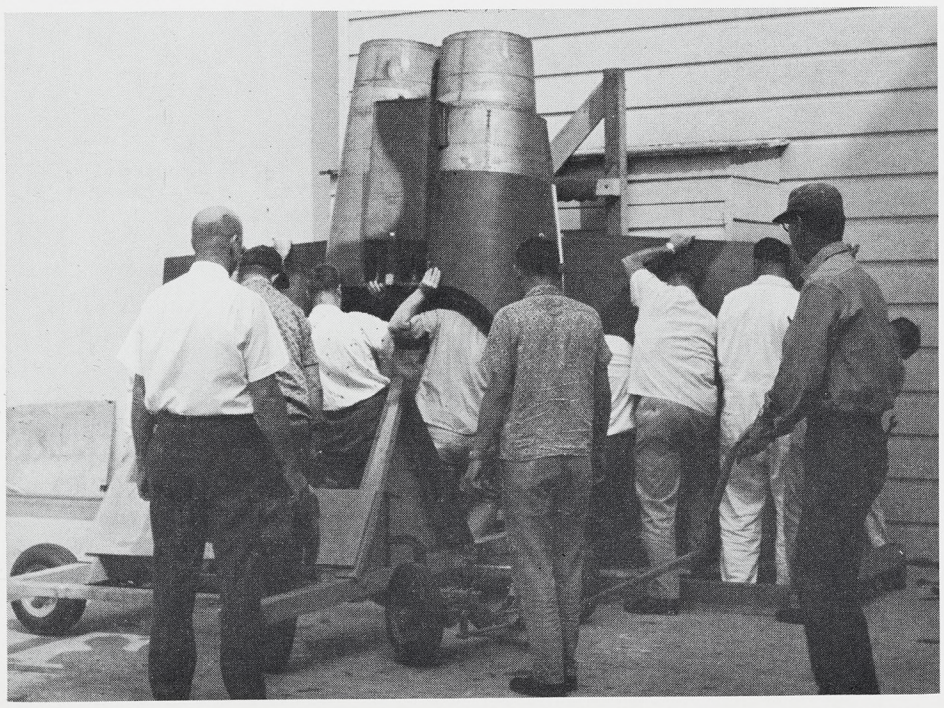
Modifications were made at Palmdale under direction of Base Administrator Tom Mc-

(See VIETNAM, page 5)



Kenneth Petersen, above, works on pylon at Norair, where design effort, production of modification parts was centered. Wally Johnson, Ron Wyatt, John Vilarino, below, were key figures in program at Palmdale. Many men, women, contributed to program success.





Northrop Norair men gently lift boattail assembly into shipping fixture. It was bound for Vietnam as part of extensive logistics effort in which Northrop helped.

Smaller spare parts for the F-5 were gathered at central point, routed on to Vietnam to support operations of 4503rd Tactical Fighter Squadron.

Gillibrand Wins Kiwanis Award; Elected to Office

Joseph C. "Whitey" Gillibrand, Northrop Norair superintendent of Maintenance, has been twice honored for his Kiwanis Club activities.

In annual elections held by the Hawthorne Kiwanis Club, Mr. Gillibrand was named first vice president with installation to be held in January. He has served for the past year as second vice president and prior to that was a member of the board of directors.

During September, Mr. Gillibrand also received a Distinguished Service Award for exceptional service as chairman of the Golden Anniversary Committee marking 50 years of Kiwanis Club operations.

His award was based on international competition in which his presentation was judged best in the entire state of California. It is the first such award known among local Kiwanians.

Don Lutz Named To Corporate Post

Don Lutz has been named director of Corporate Accounting, it has been announced by J. Grant Macdonnell, Corporate vice president and controller.

Mr. Lutz, a 14-year Northrop veteran, has been director of Finance at Northrop Space Laboratories since 1962. He has served as chief of Accounting and Budgets at Nortronics and as head of General Accounting at Norair during his long career with Northrop.

He is a graduate of the University of Southern California and is a certified public accountant.

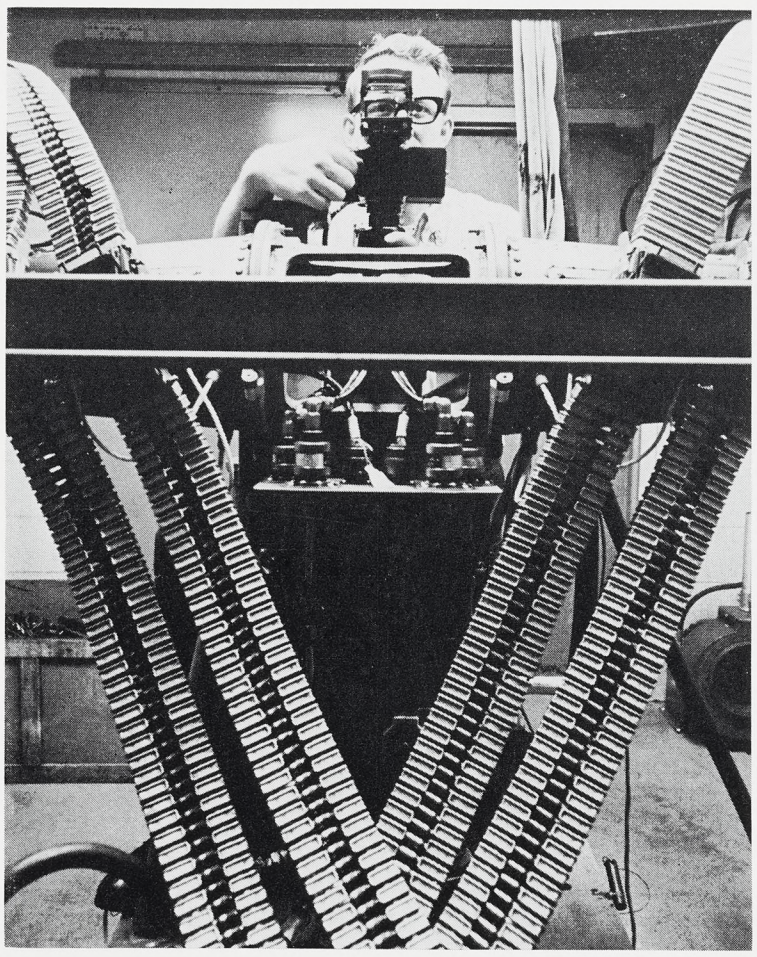
Free Trip to Hawaii Part of NRC Holidays

A free trip to Hawaii will be awarded to a paid-in-full member of the Northrop Recreation Club Christmas holidays Hawaiian tour, Jeanne Andrecht, Nortronics Hawthorne travel commissioner, has announced.

The free trip will be given by arrangement of Surl Kim of Kim Tours, the organization in charge of the December 24 to January 2 trip, with eligibility dependent on being paid up by the first week in December.

Reservations are still available from Northrop Personnel Activities offices, with the total tour price set at $378.

MACHINE GUN LINEUP



While a squadron of F-5's was being readied in California for Vietnam action, production was continuing at Needham Heights, Massachusetts, plant of Nortronics Marine Equipment Department on helicopter armament subsystems. Under a $2.6 million Army contract awarded in 1964, the four machine gun-system was designed to meet Army helicopter needs in Vietnam.

ZD DAY MEMENTOS PRESENTED ANDERSON

California Lieutenant Governor Glenn M. Anderson was presented with several special Northrop Zero Defects mementos late last month in appreciation of his participation in Northrop Norair's successful ZD kickoff ceremonies held in June of this year. T. L. McCarthy, Norair manager of Administration, and D. N. Petersen, Zero Defects Program director for the Division, made the presentations.

Lieutenant Governor Anderson was an active participant and a principal speaker at Zero Defects Day ceremonies in Hawthorne on June 22. At that time he made a special request to be kept informed of the program's progress and results.

In their visit to Mr. Anderson's Los Angeles office, Mr. McCarthy and Mr. Petersen also gave the Lieutenant Governor an informal briefing on the progress of the ZD Program at Norair.

The great number of C.A.R.E. (for Cause and Removal of Error) letters, submitted by employees at the invitation of company management, was discussed and Mr. Anderson was told about the many important and helpful suggestions contained in these letters. Also discussed were Norair management's continuing efforts, under the personal direction of General Manager Richard E. Horner, to review each letter and to apply workable ideas from them to daily company operations.

Mr. Anderson was presented a model of the Northrop-built F-5 tactical fighter, a special Northrop Zero Defects desk set, and a photographic booklet covering important phases of the Zero Defects Program. He also viewed a motion picture of filmed highlights of Zero Defects Day.

BUT HORSES STILL NEEDED

NRC Radio Club Handles Emergency

Northrop Ventura's Radio Club is sharing credit with horseback message carriers in a recently completed communications emergency.

A local telephone call to Bob Holly, Club commissioner, triggered a chain of events which involved the highway patrols of two states, the West Coast Amateur Radio Service, and the Nevada Forest Service.

The call reported that an elderly woman, a friend of the Hollys was in serious condition following a fall. Her only relative worked on a ranch in a remote section of Nevada. There was no phone service to the ranch and it was miles from the nearest highway.

Mr. Holly radioed the message to the West Coast ARS which relayed it to the California Highway Patrol. The next link was the Nevada Highway Patrol which radioed the Nevada Forest Service at Gold Creek.

Two teenage girls volunteered to take the message by horseback to the ranch, five miles away. Three hours and 20 minutes after Mr. Holly got the initial call the message was delivered.

Such emergencies are routine with ham operators, Mr. Holly said, and there is a special frequency for handling them. Called the Emergency Traffic Net, it is monitored by the Ventura Club each day at lunchtime in the NRC radio shack.

Unusual stories are the order of the afternoon after Club members tune in on the net.

Mr. Holly described one occasion when a ham operator had car trouble on the freeway. He tried without success to contact the Los Angeles Police Department. So he raised a fellow ham in Oakland and explained his problem.

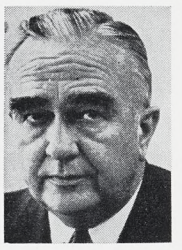
The Oakland ham called the police department there who in turn called Los Angeles police. A squad car was on the scene in minutes.

On another occasion, Mr. Holly attempted to contact his son, a marine stationed at Twenty-Nine Palms, California, to inform him of the death of a close friend. Because the antenna was pointed in the wrong direction, he couldn't reach the nearby desert base, but was receiving Hawaii loud and clear.

So, like any enterprising amateur operator would do, he asked the gentleman in Hawaii to call the base. A couple of minutes later he received an acknowledgement that the message had been delivered.

FRINGE BENEFITS

Employees Laud Disability Plan



by WILLIAM LARRABEE
Vice President—Industrial Relations

In the last issue of the Northrop News I said that I was going to discuss our various fringe benefit programs. Each of our benefits interests us all but, certainly, one which affects most of us at one time or another is our group insurance.

A vital part of any program is the way in which it is administered. The best of programs can fall short of doing the job for all of our people unless it is handled by administrators who know their business and who are dedicated to the principle that individual problems must be handled in such a way that the person involved gets the best possible treatment within the limits of the program.

After management has approved a program, someone then has to put it into effect and do the day-to-day job. In Group Insurance we have two men handling the work who are tops in their field and who are backed by highly competent staff personnel. Guy Mahan at the Corporate office arranges the purchasing of all of our insurance for us. Guy has been with Northrop for 23 years and reports directly to the vice president and controller. When any of us has a group insurance claim he goes through William "Bill" Waldon. Bill has been with Northrop for 11 years and works for Corporate Industrial Relations. He and his people have their offices at the Hawthorne facility and his door is always open to discuss any claims problem and to help us handle our group insurance claims to our best advantage.

Mr. Waldon

Mr. Mahan

So much for the people to whom we look to do the job for us. Let's take a look now at a few of the individual benefits. I can't cover them all in this article, but one of which we have every right to be proud as a Northrop "first" for our area is what we call our "long term disability coverage". After the prescribed waiting period, a Northrop employee who is covered by the over-all Northrop Corporation plan and is totally disabled is paid up to 60 percent of his or her gross base compensation, though not over $200 per week. This payment is made regularly until the employee reaches age 65 as long as he is "totally disabled" as defined in the insurance policy. The total cost is paid by the company. The details of the plan are set out in your Group Insurance booklet on page 21.

Most of us give very little thought to the possibility of our being disabled until we are hit by a catastrophe — and without this coverage it could be a real catastrophe. Bill Waldon has received letter after letter on this subject. One of our people wrote, "I have just received my first check from long term disability. What can I say? We are so appreciative of such a plan. To tell you the truth, when the memo was circulated I didn't give it a second thought. Who's going to need that kind of coverage? Little did I know I would probably be one of the first." Another letter read, in part, "Little did I think . . . that I would personally be benefitting because of total disability . . . I have seen all kinds of very good group insurance plans but long term disability is worth more than any '360 days room and board' or other exotic '1st-dollar' coverages. I am speaking personally. However, it is a terrific protection to all Northrop employees. I am sure very few realize just what 'income protection' (long term disability) really means. I hope very few ever do." Another disabled man wrote, "It is cooperation like this that has made Northrop a good place to work for the past 25 years. I look forward to the day when I may again join the Northrop fine working force."

Right now there are 99 people who are being saved from catastrophic problems through our long term disability program. Sixty-eight more who have drawn money under the plan have recovered and returned to work. Most of us know some of these people. I think that we have every right to boast a little bit about filling such a real need.

In my next article I am going to cover some further group insurance benefits.

Big La Jolla Trip On Tap for Netters

That "big" event of the year of the NRC Tennis Club—the trip to La Jolla on November 6 and 7—is at hand with deadline for reservations this Friday, October 22.

This is the fourth annual visit of NRC netmen to the La Jolla Beach and Tennis Club, a showplace of the Southland. Last year 100 took part in a similar trip.

Reservations are available for a variety of accommodations, with reasonable rates for all. There will be such extra added attractions as a group dinner, night club visit, golf, baby sitters, etc.

And NRC players will square off against a host team at 1 p.m. Saturday and 10 a.m. Sunday. Events will include both men's and women's doubles and mixed doubles.

Detailed information is available through Personnel Activities where reservations will also be accepted, NRC Commissioner John Potts reports.

NORTHROP NEWS

Vol. 23 No. 18

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

E-Z SHORTHAND COURSE TO OPEN AT HAWTHORNE

A new "E-Z Speedy Shorthand" course will open at the NRC Clubhouse at Hawthorne for a six-week (12 sessions) period and is open to Northrop personnel in the Hawthorne area.

Personnel Activities, in conjunction with Personnel Development and Training, has made arrangements for the course.

Total cost is $3 per person, including text and materials. No previous shorthand knowledge is required for this new alphabet simplified system which provides a shorthand foundation for most dictation requirements.

Classes will meet from 5 to 7 p.m. Mondays and Thursdays during the six-week period.

Those interested may enroll by paying their course fee at Norair's Personnel Activities office or the Personnel office at Nortronics Hawthorne.

Test Society Honors Two From Norair

Two Northrop Norair men, Dan O'Halloran and Ed Regalado, will be singled out for special recognition during the 25th National Convention of the Society for Non-Destructive Testing to be held October 17-21 at Detroit.

Mr. O'Halloran, Norair's chief of Quality Control, is the Society's first candidate for national secretary to be selected by the general membership. He has served as a national director for three years, chaired the Transportation Division of the Technical Council, and coordinated publication of "Materials Evaluation," official Society journal.

Mr. Regalado, Norair general supervisor of Quality Control Engineering, will accept the President's Award for excellence in section management. This award goes to the Los Angeles section for which Mr. Regalado has served as president for the past year and a half.

009 TASK FORCE

Northrop Ventura task force has arrived at Kennedy Space Center, Florida, to provide support for Earth Landing System portion of Apollo Spacecraft 009, scheduled to be launched early next year. An unmanned flight, Spacecraft 009 will be the first from the Space Center. Huddled around parachute packing equipment above are (from left) Cary Buhler, Bill Downs, John Simpson, Don Severs, and Tasswell Payne.

SYSTEMS APPROACH CONSIDERED IN USE OF EXOTIC MATERIALS

Use of exotic materials in aircraft and aerospace vehicles may require a systems engineering approach in design and manufacture because of complexities involved in the present early stages of development.

A Northrop paper presented October 6 at the Society of Automotive Engineers Aeronautic and Space Engineering and Manufacturing meeting emphasized the importance of this systems engineering approach and of close liaison between designers, processors and fabricators utilizing exotic materials.

The paper was presented jointly by Norair's Dr. Eugene W. Emmerich, supervisor of Metallic Research; E. D. Jacobs, Supersonic Transport project chief; and Dr. Richard L. Jones, director, Research and Technologies, during the third day of the SAE meeting at the Statler Hilton Hotel.

Exotic materials are defined as those that can withstand a thermal environment that aluminum is incapable of withstanding. These substances range from titanium through the refractory materials and into the ceramics.

"The current trend to exotic materials," the paper continued, "has and will continue to place a greater burden on the airframe designer.

"In the past he has been accustomed to designing in aluminum, and his experience allows him to design without an extensive amount of coordination with Material and Manufacturing personnel. In essence he has had control of the design by knowing

(See MATERIALS, page 5)

MEETINGS

New License Society Selects Oliver to Speak

Corporate Licensing Administrator John Oliver has been selected keynote speaker for the two-day founding meeting of the Licensing Executives Society at Hollywood Park, Florida, October 21 and 22.

A pioneer in developing product licensing as a significant corporate function in the United States, Mr. Oliver also has been elected temporary West Coast vice president subject to formal approval by membership at the first meeting.

Mr. Oliver

According to Mr. Oliver, the new society will have as its chief objectives:

—To improve the professional status and ethics of licensing directors;

—To exchange general experiences in domestic and foreign licensing;

—To foster a better understanding of the licensing function as an aid to and a part of effective management;

—To keep members informed of changes in law and government regulations which may affect licensing.

Mr. Oliver was instrumental in establishing a Licensing Committee of the Los Angeles Chamber of Commerce and has been its chairman since 1958. The committee has been the principal vehicle for promoting product licensing on the West Coast through such activities as Licensing Opportunity Day and other exhibits which have served as a market place for companies seeking new products.

Mr. Oliver's other efforts in promoting the professional status of licensing has included dozens of speaking engagements before other professional societies and seminars. Last week he addressed the Long Beach chapter of the American Society of Tool and Manufacturing Engineers, and on November 2 will speak to the Santa Ana Valley chapter of the same society.

He will be the co-chairman and keynote speaker December 6-8 at an American Management Association seminar in Los Angeles on industrial utilization of by-products from the aerospace industry.

"Speaking about licensing is an easy and pleasant task," Mr. Oliver said, "because it is stimulating and profitable to all parties involved.

"Licensing is profitable to the inventor of a product through initial cash awards and subsequent royalties; it is profitable to the licensor through long-term royalties with a minimum overhead expense; it is profitable to the licensee through increased sales volume from new products; and it is profitable to the consumer who is the ultimate beneficiary of commercial application of the latest aerospace technology."

EDP Discussion Led By Dan Cashier

Electronic data processing (EDP) as a tool of accounting management and the accountant's responsibilities for successful implementation of EDP systems was discussed October 20 by Dan Cashier, group administrator of General Accounting at Northrop Ventura, at a meeting sponsored by the San Fernando Valley chapter of the National Association of Accountants.

Mr. Cashier is discussion leader of one of two sessions which will run concurrently. The other session will feature Frank A. Sweeney of Defense Contract Audit Agency who will speak on the accountant and government contracting. The meeting will begin at 5 p.m. at the Skytrails Restaurant at Van Nuys Airport.

HOW TO ANALYZE AIRCRAFT FATIGUE

Strip It, X-Ray It, Test Each Component, Reassemble It

Northrop Norair this month passes the mid-point in conducting one of the most comprehensive and detailed teardown inspection programs ever performed on military aircraft.

It is called an Analytical Condition Inspection (ACI) program.

It involves two Northrop-built T-38 Talon trainers, sister ships in a fleet of aircraft that has established an enviable record in more than adequately meeting mission requirements while maintaining one of the lowest jet aircraft accident rates in history.

The program is, however, indicative of current emphasis in the Air Force to plan ahead, to prevent possible problem areas, and to keep a maximum number of aircraft operational.

As part of contractual obligations on the T-38 program, Northrop Norair performed a detailed Fatigue Certification Test program completed in late 1964. It led to conclusions that the T-38 airframe could be operated and maintained at base level for a projected life of 15,000 flying hours without a depot or factory-level inspection.

Despite the thoroughness of the fatigue tests and the obvious success of operational T-38 squadrons, it was recognized laboratory testing could not reproduce in-service environments, particularly with respect to temperatures, pressures and long-term exposure to weather.

Thus, the ACI program becomes a sort of marriage of laboratory testing and service usage to augment existing test data on the aircraft.

The Air Training Command and Air Force Logistics Command, through its San Antonio Air Materiel Area, are responsible for the ACI program with coordinating efforts provided by Northrop's Air Force Plant Representative.

Briefly stated, the ACI objectives are to verify through tear-down inspection, beyond the scope of base capability, that the aircraft condition is consistent with that predicted; through wear measurements and analysis of the performance of functional systems, to establish or verify replacement, maintenance, and overhaul schedules; and to verify or augment Structural Repair Manuals.

EXACTING ROUTINE—Tom Boesvert (left), project leader, and Gunnar Carlson (right), foreman, confer with John Williams during T-38 tear-down inspection work. They are shown with wing assembly. Two high-time T-38s were subjected to detailed tear-down inspection under Air Force program.

Two high-time T-38 aircraft from ATC using squadrons were selected for the program.

They are involved in a rather unique program which is a reverse of assembly steps taken to produce new T-38s.

First, the aircraft went to Palmdale for functional test flights in which their performance was compared with current production standards and production aircraft.

"We found both T-38s to be in good condition despite the fact each has logged in excess of 1650 flying hours," said V. G. Cardoza, project director, T-38 Project.

Following special systems test carried out at Palmdale, test ships were stripped of all paint and

(See INSPECTION, page 5)

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Stole, mink, natural sapphire, seldom worn, $350. Gardena, DA 3-6641. A

Apt, 4-unit, 1-yr.-old, carports, San Pedro, P.V. area, near school, park, & freeway, $45,000. Box 1801. A

Buick station wagon, 1955, 4-dr., p/b, p/s, auto trans., w/s/w, recent o/haul, $325. Long Bch., 596-1280. A

Range, gas, Kenmore, 26x30, 2½-yrs.-old, 4-burner, Visi-Bake oven, $75. Hawthorne, 644-1572. A

Aquarium, complete, 7½-gal. & 10-gal., $25. Hawthorne, 676-1441. A

Buick Electra, 1960, convt., bucket seats, $1175. L.A., PL 7-7911. A

Lawnmower, Craftsman rotary, instructions & parts list incl., $50. Gardena, 329-9484. A

Coffee Table & round lamp table, mahogany, $20. Torrance, FA 8-4243. A

Buick Roadmaster, 1955 4-dr. sedan, p/s, p/b, r/h, auto. trans., orig. owner, avail. after Nov. 1, $350. Glendale, 241-7656. A

Surfboard, 10'3" Bing, $75. Torrance, FA 8-6567. A

Piano, cabinet grand, mahogany, $150. Torrance, FR 8-1350. A

Home, 4-bdrm., fam. room, 2-bath, & built-ins incl. dishwasher, fenced yard, 1-yr.-old, 1 mile to Research Park, $41,900. P.V. Pen., 377-5172. A

Ford, 1958 V-8 4-dr. h/top, r/h, $250. Anaheim, 776-0849. A

Doll collection, miniature, 86 dolls & animals, $15. P.V. Pen., FR 8-1863. A

Cemetery Plots, 2 at Inglewood, Greenlawn sect. adjoining, $350 ea. Hawthorne, OS 6-8842. A

Chevrolet SS, 1963, 409 w/425 hp, 4-spd., new 488 positraction, Douglas headers, American mags, 1900 act. miles, many extras, $1950. L.A., 757-5455. A

Sportsman, 26" Huffy, 3-spd., spring book rack, front & rear gen. lights, high pressure tires, $25. San Pedro, 831-4956. A

Corvette, 1962, h/top, 4-spd., positrac., 300 hp, tonneau, $2200. Gardena, 327-3811. A

Couch w/matching chair, $45. Torrance, 834-2845. A

Home, 3-bdrm., 1¾ bath, recently painted, dble. garage, water softener, block walls, patio, near schools & park, 5 minutes from Norair, $24,800. L.A., PL 6-0015. A

Pup, poodle, 10-wks-old, black male, AKC reg., has shots & papers, $75. Compton, 632-4978. A

Volkswagen 1600, 1966, square back sedan, 65 hp, disc brakes, 1600 miles, $2495. P.V., 377-1075. A

MGA, 1957, recent eng. overhaul, $550. Redondo Bch., 379-6456. A

Buick, 1962 LeSabre, 4-dr. h/top, air cond., $1850. L.A., AX 4-1249. A

Doodle Bug, lots of chrome, $100. Inglewood, PL 6-7681. A

Accordion, 1020-bass, $85. L.A., PL 7-4487.

Cabin Cruiser, 24', glassed hull, 2 bunks, 50 hp Mercury outbd., self-starting, recently painted, $750. Torrance, PL 6-4974, MA 2-5966. A

Hams, complete station, national NC-300, EICO 723, 60 watts, 8 tals, relay, complete inverted vee antenna w/coax. mast & guys, $210. San Pedro, TE 3-9696. A

Motorbike, Sears Mo-Ped., $95. Hawthorne, OS 9-6247. A

Rifle, Marlin 39-A, level action 22 cal., Weaver 6x scope, diamond inlay, vinyl case, 100 rds. ammo, $85. Hawthorne, 676-4251. A

Corvair Monza, 1963, 4-spd., other extras, $1275. Lomita, 326-8959. A

Surfboard, 9'3", 3 redwood stripes, $50. Torrance, 375-9657. A

Pups, German shepherds, 5-wks-old, $30 males, $25 females. Northridge, 349-5904. A

House, 3-bdrm. & den, redecorated, fenced yard, $18,950. Inglewood, OR 4-0366. A

House, 4-bdrm. & family room, 2½ baths, 1 acre, horses OK, near Northrop Ventura, $35,000. Somis, 805-482-1186. A

Bedroom Set, dresser w/mirror, headboard & frame, 2 night stands, Chinese modern, $20. Hawthorne, 676-0929. A

Ford, 1934, 5-window coupe, 1948 Mercury eng., special carburetor, manifold, & trans., $500. Box 1802. A

Carburetor, Renault, Solex model 28 1BT, completely rebuilt, $9. Torrance, 327-4585. A

Refrigerator, Kelvinator, 12 cu. ft., 6-yrs-old, 80-lb. freezer, $50. Torrance, 371-5916.

T-bird, 1955, classic, auto., all-powered, w/s/w, $1075. Inglewood, 673-0752. A

Sectional, 3-pc., turquoise w/corner table & lamp, $50. Inglewood, OS 6-1475. A

Chevrolet, 1955, Bel Aire, 2-dr., h/top, sedan, V-8, std. trans., $300. Inglewood, 672-5834. A

For Sale

Karmann Ghia, 1958, radio, 4 new tires & paint, $750. L.A., 662-1349, 247-0128. A

Sailboat, 15' Sunray w/trailer, $200. Torrance, DA 3-2144. A

Stereo, AM-FM, radio & phono., walnut finish, $75. Gardena, DA 9-4762. A

Thunderbird, 1960, p/s, p/b, elec. windows, 4-way p/seat, new tires & battery, $1095. P.V., 377-1075. A

Honda 50, only 30 miles, elec. starter, windshield, mirrors, $270. L.A., 754-3946. A

Dodge, 1948, convt., $75. Hawthorne, OR 1-1660. A

Ford pickup, 1964, V-8, auto. trans., r/h, custom cab. $1650. Gardena, OR 7-3884. A

Vacuum Cleaner, Eureka Empress, 2-spd., carrying case, all attachments, 4-mos-old, $80. Culver City, 836-4934. A

Poodle, 1½-yr-old, AKC reg., black, miniature, female, spayed, $50. Tarzana, 343-6669.

Gun Cabinet, solid maple w/glass door, 6 gun racks, storage space, $50. Gardena, 323-0934. A

Honda, 1964 Scrambler, 250 cc, $475. Corona del Mar, 673-5747. A

Pickup truck, 1956, new paint, $525. Torrance, 320-5720. A

Chevrolet Super Sport, 1964, full power, air cond., good tires, $2300. Gardena, 675-0635.

Table Saw, 8" blade, 2 ext. tables & miter, $90. L.A., 670-4557. A

Range, gas, Wedgewood, 27", 3-yrs-old, w/clock, large oven & broiler, $100. Gardena, FA 1-2848. A

Tires, 5-lug 8" rims for boat trailers, $10 ea. Anaheim, 776-1374. A

Crib, full-size, mattress, $25. Hawthorne, 676-3575. A

House, custom-built, 3-bdrm., 1¾ bath, deluxe features, fenced rear garden, close to Northrop, $28,000. Hawthorne, 675-8829. A

Ford town sedan, 1956, V-8, 4-dr., new paint, smog device, $200. Gardena, 323-9143. A

Air Conditioner, GE room-type, used 2 weeks, 7300 BTU, $125. L.A., 388-9798. A

Mercury, 1955, 4-dr., h/top, r/h, p/s, p/b, low mileage, $200. Hawthorne, OS 5-0896. A

Acreage, 40, Xmas Valley, Oregon, sportsman's area, level, $125. acre, Lennox, OR 7-3788. A

TV, 17", Crosley console, mahogany cabinet, continuous tuning, $25. Torrance, FA 8-6839.

Model T Pickup, 1915, new 283 Corvette eng., body needs finishing, $400. Norwalk, 864-0248. A

Bar Stool Set, w/backrest, maple, $10. Long Bch., GA 3-1363. A

Piano, Geo. Birkel ebony baby grand w/bench, $850. Gardena, DA 4-8042. A

Radio/Record Player Stereo, Magnavox, $250. L.A., 645-6815. A

Plymouth, 1956, 2-dr., Belvedere, 6-cyl, auto. trans., r/h, $200. Los Alamitos, GE 0-1952.

Pontiac, 1955, 4-dr. sedan, r/h, good tires, 72,000 act. miles, $250. Redondo Bch., FR 5-5471. A

House, 2-bdrm., 2-bath, new paint, 10% dn., $24,500. Hawthorne, OS 9-7909. A

Bicycle, 26" girl's 3-spd. Schwinn, $20. Lakewood, 867-0593. A

Cabin Site, Lake Arrowhead, has water, electricity, roads & trees, terms avail., $1200. L.A., 476-1635. A

Buick, 1954, Century, $100. Redondo Bch., FR 5-0747. A

Porsche, 1955 convt., new tires $850. Torrance, 371-8365. A

Buick, 1966, LeSabre, 1965, 400 h/top, factory air cond., auto., p/s, p/b, w/s/w, stereo reverb., 6000 mi., $3250. Altadena, 377-6528. A

Piccolo, Bently, wooden, D-flat, completely rebuilt, $110. L.A. 684-8611. A

Home, rustic charmer, 3-bdrm. or 2-bdrm. & convt., completely redecorated, fireplace, covered patio, dble. garage, carport, $23,500. Hawthorne, OS 6-1985, DA 9-5126. A

Toy Poodle, white, 18-mos-old, AKC registered, male, good home wanted, $35. Playa del Rey, 398-1458. A

Gelira 202, 1965, 100 mpg, 20 hp, extras, take over $35 mo. pymts. or $595. Hawthorne 579-5864. A

VW sedan, 1965, 8000 miles, many extras, $1850. L.A., 474-9790. A

Crib & mattress, $15. Hawthorne, 371-0194.

Trailer, 15' Ideal, many extras, $500. Inglewood, OR 1-2058. A

Refrigerator, crosstop freezer, $20. Gardena, 757-2383. A

Guitar, elec. melody, w/med. size Magnatone amplifier, $150. Rolling Hills, 833-9747.

Accordion, Cantino, 120-bass, w/case, $150. Redondo Bch., FR 5-4448. A

House, 3-bdrm., 2 baths, lge. fenced yard & patio, near schools & park, kitchen built-ins, paneled, forced air heat, $23,000. La Mirada, 714-521-1516.

Radio, for 6-volt car or boat, $10. Hawthorne, 676-0418. A

House, 2-bdrm., fireplace, double garage, $21,950. Inglewood, OR 1-3860. A

Mercury colony park wagon, 1963 full power, air cond., 9 passenger, $2495. Gardena, DA 4-5342. A

Ski Boat, 14', 1965 100 hp Mercury motor, trailer, $1500. Hawthorne OS 5-1684. A

Wanted to Buy

Baby furniture in good condition. Anaheim, 530-4869. B

Freezer, 15 cu. ft. capacity or larger, good condition. Torrance, 675-8414. B

Wanted to Buy

Barbell Set. Inglewood, 672-4486. B

Radial Arm Saw or tilt arbor table saw. Torrance, 320-3440. B

Typewriter. L.A., AX 2-4958. B

Steering Wheel, wood, for sports car. Rolling Hills Ests., FR 5-8920. B

FREE (To Be Given Away)

Pups, 6-wks-old, 5 males, 2 females. Torrance, DA 5-1190. D

Rentals Offered

Apt., 2-bdrm., unfurn., gar., w/light duties, $100 mo. Inglewood, 677-5705. E

Apt., deluxe single, furn., large closets, full bath, utilities paid, walk to Northrop, Hawthorne, OS 5-3792. E

House, 2-bdrm., large, fenced yd., trash & water paid, $105. mo. Lawndale, 371-6775. E

House, 2-bdrm., unfurn., water & trash paid, 1 block from Northrop, adults, $85 mo. Hawthorne, OS 6-8283. E

Apt., 2-bdrm., 2-bath, large exec.-type, closed gar., walking distance to Northrop, $125 mo. Hawthorne, 676-9620. E

Apt., 2-bdrm., all extras, closed gar., encl. yard, 10 mins. to Nortronics P.V., $110-$125. Torrance, 375-9397, 375-2091. E

House, 4-bdrm., fam. rm., 5 min. to Harbor Fwy., fenced, walk to jr. high school, corner, 2 fireplaces, 2-bath, lease, $245 mo. San Pedro, TE 3-4591. E

House, 1-bdrm., furn., large encl. yard w/vegetable garden, $80 mo. San Pedro, TE 3-2512. E

Apt., 1-bdrm., closed garage, laundry facilities, water & trash paid, $89. Torrance, 328-6955. E

Apt., 2-bdrm., furn., adults only, no pets, $125 mo. Inglewood, 673-0401. E

Studio Apt., 3-bdrm., 2-bath, unfurn., pvt. patio, closed gar., soundproofed, hot water & trash paid, near schools, $175 mo. Torrance, FR 5-0867. E

House, 2-bdrm., no garage, $90 mo. Gardena, OR 7-3884. E

House, 3-bdrm. & den, refrig. & breakfast bar stools furn., 1½ baths, $180 mo. P.V. Pen., 377-8748. E

Studio Apt., 2-bdrm., completely furn., 1½ baths, pool, sauna bath, putting green, sub. parking, rec. rm., $164.50. Redondo Bch., 674-1566. E

House, 2-bdrm., fenced yard, gar., stove & refrig. avail, close to Northrop, $135 mo. Harbor City, 325-5705. E

House, 3-bdrm., fireplace, air cond., less than a year old, completely landscaped, $170 mo. Lakeview Ter., 899-3019. E

House, unfurn., 3-bdrm., 1¾ baths, fenced yd., water & lawn paid, 8 min. to Norair, closed gar., $130 mo. L.A., PL 4-1964. E

Apt., 2-bdrm., avail Nov. 1, 2 blks. to Norair, $115 mo. Hawthorne, OS 6-7417. E

House, unfurn., 2-bdrm. & rumpus rm., backyard w/b-b-q pit, $125 mo. Gardena DA 7-2339. E

House, furn., 1½-bdrm., w/garage, half block from ocean, $130 mo. Manhattan Bch., 374-5028, 379-8700. E

Apt., 1-bdrm., furn., pvt. deck, lge. pool, sub. garage, near Northrop, $145 mo. Lawndale, 377-4372, 679-7426. E

Cabins, Lake Gregory & Crestline, sleeps 6, $25. weekends, $60 week. Venice, EX 1-2040. E

Child Care Wanted

Baby sitting at home, prefer children under 2-yrs-old. Lawndale, 679-9221. H

Personals

Secretaries, 2, willing to share 4-bdrm. house. Hermosa Bch., 374-7109. L

Tap Dancing lessons for children. Gardena, 675-1005. L

For Sale or Trade

Chevrolet, 1958, auto. trans., new tires, A.R.C. record player, $600 or trade for Volkswagen. Montebello, 722-7680. M

House, 3-bdrm., split-level, 1½-bath, dble. garage, for rent or $21,000 or trade equity for vacant lot. Redondo Bch., 374-2433. M

Renault Parts, rearend, generator, starter, complete head & misc. parts, $50 or trade for freezer. Torrance, DA 6-5558. M

Volkswagen, 1961, radio, gauge & spare tank, extras, $900 or will consider trade for vacation trailer. Camarillo, 805-482-6125. M

LIKE TREES AND CONCRETE—Combat ready F-5's blend nicely with both colors of foliage and runway in this scene at Williams Air Force Base, Arizona, where training is currently under way for Vietnam mission.

VIETNAM: 'A Little of Each Of Us Will Be Going Along'

(Continued from page 2)

Cracken and Superintendent Al Graber. Men like Wally Johnson, John Vilarino and Ron Wyatt were key leaders. Special crews were "drafted" for the tasks and their normal tasks assumed by regular crews. The task force numbered about 36 men.

I found that at Palmdale a seven-day week was the rule for all supervision and most technicians. Captain Earl Hallum, AFPR Flight Test officer, added to my knowledge with:

"You cannot give these men too much credit. They took a difficult task and performed it under pressure. And they did the job right the first time."

Those who know the program best were high in their praise of a fantastically successful flight test program supporting it. One of the first modified aircraft was sent to Edwards Air Force Base where it joined another F-5 in a round of certification tests. Bob Elder, Hank Chouteau, Dick Thomas, John Januleski and Darrell Cornell were instrumental in all flight test operations. Jack Farley and Les Ferguson were key support leaders at Edwards.

One indication of the extent of this program was the fact that in just three days of extensive tests Northrop and Air Force pilots made nearly 200 hook-ups with the jet tanker in refueling tests.

Larry Green was a key leader in flight test engineering activities supporting the over-all program.

Concurrent with the production efforts Northrop was filling still another role as an agent for the Air Force Logistics Command helping round up and prepare for shipment requiring spares. Product Support's John Jennette informed me this involved more than 800 items over and above normal Air Force logistic supplies.

At the same time the Air Force had ordered an accelerated training program be conducted at Williams AFB for pilots and maintenance personnel of the 4503rd Tactical Fighter Squadron, the unit to operate the F-5s in Vietnam. Colonel Frank Emory, the squadron commander, was a frequent visitor to Palmdale and a driving force in the over-all program.

Special assists were made by men like Captain B. F. O'Brien of the F-5 Systems Program Office and Major Tom Crockett of the San Antonio Air Materiel Area along with Ron Weigle of the same organization.

I wish space were available to list the name of every man and woman who worked on this program. They deserve it. However, I would be remiss in not mentioning men like W. E. Woolwine, the key management leader, and others like Bill Putnam, Jack Nation, Jim Alexander, Bob Miller, Bill Bruschaber, C. L. Fleming and John Martin.

And, of course, there were others like Major Roy Boyd and Jess Dennis of the Northrop AFPR who were always in the thick of the action involved.

Maybe a comment Al Graber made to me sums up the feelings of all who worked on the program: "We have always prided ourselves on producing the best aircraft possible for our customers. We did this and a little more with these F-5s. Most of us like to feel that a little of each of us will be going to Vietnam."

INSPECTION

(Continued from page 4)

markings and trucked to Hawthorne.

The ACI program is centered in Hangar 13 and has involved many organizations and functions at Norair. Every part and system not permanently fastened to the airframe was removed and subjected to nondestructive testing. The remaining airframe hulls were completely stripped of all sealants, etc. and put through similar tests. All electrical wiring and components went through high voltage tests. Wing structures and all honeycomb panels were X-rayed. Exacting wear measurements were made on selected component or system and detailed records made for the publication of comprehensive test results later.

The program got under way in May. Current efforts are involved in re-assembly of the first aircraft now slated for flight test in December. The final ship will be delivered by March 1966.

Each Norair function and activity has contributed to the program on an "as needed" basis. For instance, engineers, inspectors, processing, and tooling people have worked on the program from time to time.

Tom Boesvert was transferred to the T-38 Project office and assigned as project engineer and over-all coordinator for the effort. Gunnar Carlson is foreman of a 10-man Advanced Production crew of technicians assigned to the program.

"When these aircraft are reassembled they will be put through normal production checkout and flight operations," Mr. Cardoza said. "Upon return to using squadrons they will be further exposed to operational conditions and closely analyzed from time to time."

MATERIALS

(Continued from page 4)

the limitations of aluminum alloys.

"This empirical knowledge, gained from experience, does not exist for most of the exotic materials."

Northrop has been involved in several programs related to the optimization and utilization of modern exotic materials. Brazing of molybdenum and Rene 41, hot forming of titanium alloys, machining of titanium and super alloys, titanium welding, and adhesive bonding are among the processes investigated.

CAKE, COFFEE FOR 250—Nortronics Anaheim guests at surprise party commemorating completion of long-time production order for Polaris Mark 7 MTRE units enjoy break-time festivities. Cake and coffee was served production workers who also heard key management men discuss success of program.

PARTY

(Continued from page 1)

restrictions. Mr. Lynch asked for their continued support in future work assignments of this nature.

Before the party was over special steps were taken to see that sufficient refreshments were held back for a similar party for those assigned to the night shift.

Mary Stec, an assembler, summed up the feelings of the honorees by saying:

"This was a complete surprise to all of us, but a very pleasant one. Mr. Lynch's talk was especially interesting to us and we appreciated the opportunity to recall the many days we have spent on Mark 7 production. We all appreciate the thoughtfulness that prompted the party and the chance to chat informally with so many members of top management."

POLARIS PARTY—These six Nortronics Anaheim ladies were among 250 taking part in surprise party held recently. Note cake with Polaris missile. Occasion marked completion of final Mark 7 Polaris MTRE under long-term contract.

Guerrera Named To MED Position

Frank Guerrera will become chief of the Marine Navigation Equipment group, Marketing section, at Nortronics Marine Equipment Department, Needham Heights, Massachusetts, effective October 11.

Mr. Guerrera, a senior applications engineer in the Space and Information Equipment group at Palos Verdes, has been connected with such programs as ALOTS and the contour contrasts seeker system. He has been with Nortronics for a year.

Time Change Due

Northrop Corporation operations in California will revert to Pacific Standard Time at midnight October 30.

At that time clocks will be set back one hour. Northrop work shifts will begin in accordance with the new time on November 1.

25 Years: Frieda Mooring Becomes First Woman to Reach Milestone

(Continued from page 1)

at Nortronics Anaheim.

Mrs. Mooring's current assignments include major subcontracts, rentals, deficit balance reporting, and special assignment work involving reconciliation of vendor accounting documents with those of Nortronics.

One special assignment found her perusing a foot high stack of paperwork accumulated in a two year period.

"It took me over a week," Mrs. Mooring said, "but I finally determined that a vendor of liquefied gas had transferred his services to Norair but neglected to transfer billings for use of the gas cylinders from Nortronics to Norair.

"Correlating information is one of our big jobs," she said. "We have to look at the vendor's documents and figure out the system of his paperwork. Once we do that, we can determine what particular service or material he's charging for and how much is due him."

The business of handling accounts payable is a pretty stable one, according to Mrs. Mooring, although, she admitted, it does fluctuate a little with the rise and fall of business volume.

"We never seem to get caught up," she said. "As soon as we get our accounts in good shape we find something else comes along to keep us just as busy as before.

"The biggest change I've seen in our group is the acquisition of our IBM 632 system. It permits us to do our own accounts recording and write our own checks, speeding up payments.

"Outside of that, there aren't many changes in the accounting business. But there is a great deal of personal satisfaction in watching your work and the work of others help make the company grow."

At one time Mrs. Mooring planned to become a teacher and studied at Oklahoma A&M, now Oklahoma State.

"It takes a different kind of patience for accounting than it does to control and inform a group of students," she said. "I changed my mind about teaching and went to comptometry school instead."

By coincidence, the computer machine she uses occasionally is a model like one she used when she first started at Northrop.

Mrs. Mooring will be feted at a luncheon at the Cockatoo Inn, Thursday, October 14. She will also be honored at the November Nortronics Management Club meeting when she will receive her 25-year service pin.

CHRISTMAS SHARING TRADITION CONTINUES

Voluntary sharing with those in need at Christmas has become a cherished tradition near to the heart of Northrop people.

Last year 47 families, including 196 children, and three charities were benefactors of employees' generosity, receiving $11,356, plus toys, clothing and food items.

Initial steps to perpetuate this tradition have been taken this year in the naming of a 1965 Christmas committee. This group will coordinate the over-all program among participating personnel at the Corporate office, Northrop Norair and Northrop Nortronics facilities at Hawthorne and Palos Verdes. Nortronics Anaheim conducts its own efforts in this field.

Committee members are H. P. Clark, Guy G. Kirby, J. N. McNamara, E. L. Nolan, B. A. Rogers, Larry Long, Marie Tully and Ray Turner jr. Two additional members are to be appointed.

This week the committee appealed to employees to refer possible needy Northrop families for consideration in this program. Referrals may be made through supervision on or before November 1.

Information is available through Mrs. Tully, ext. 786, Norair.

NRC ROUNDUP

Golfers Crown Champs; Basketball Call Sounded

Those long tee shots, curling putts and sand trap hackings are all over now and NRC has crowned winners in its popular annual summer Twilite golf program.

First and second round winners among 32 teams taking part in Inglewood Golf Course short leagues (3 of them) met October 6 to determine the annual champions. Dave Krieghoff and Bob Barron of Nortronics Hawthorne copped the championship, downing Paul Rogers and Paul Green of Norair.

Things were not so cut and dried among participants in 13 long course leagues (with 132 teams) played at Western Avenue, Alondra and Los Verdes courses. After an initial 18-hole playoff held at Green River Golf Course, Corona, four teams were tied for first.

During the week of October 4-8 playoffs were held at Alondra with Ted Dequisne and Bob Harrod of Nortronics Palos Verdes the winners. Runner-up honors went to Don Sherman (Davidson Brothers) and Charlie Hutcheson of Norair.

* * *

Shop Cage Practice Session Is Planned

First call for basketball teams interested in taking part in NRC-sponsored shop league action this year at Hawthorne was issued this week by Tom White of Personnel Activities.

The Leuzinger high school boys' gym has been reserved for team practice at 9 a.m. October 23. Information on league activities is available through Mr. White, ext. 2486 at Norair.

* * *

Space Is Available In Ballroom Class

Northrop personnel in the Hawthorne area may still enter a series of ballroom dancing lessons being offered at NRC Clubhouse each Thursday.

Western swing is taught at 7:30 p.m.; the waltz at 8:30 p.m.; and silver tango at 9:45 p.m. Cost is $5 per person for each class.

COMBAT

(Continued from page 1)

complished while maintaining vigilant cost effectiveness control."

Engineering on the project was performed by a special task force under the direction of Lew Nelson, Skoshi Tiger deputy program manager. Fabrication of modified parts was handled by Advanced Production and Weld section at Norair.

Nortronics Anaheim, which has been producing pylons for the F-5 since the beginning of the program at Northrop, providing the jettisonable pylons.

Detailed modification work was centered at the Palmdale facility and flight testing was completed by Northrop pilots at both Palmdale and Edwards Air Force Base.

While Northrop was producing the special aircraft, pilots and crews of the 4503rd Tactical Fighter Squadron were already in training for their future combat mission in the F-5's.

Related story on page 2.

Lessons to Begin For Square Dancers

A three-week series of beginning square dance lessons for adults opens tomorrow night, 7:30, under sponsorship of the NRC Square Jets.

Instruction is offered at Hill Rancho, 15701 Crenshaw Blvd. at the same time each Thursday for three weeks.

* * *

Deadline Extended For Golf Tourney

Openings remain and the deadline for entering has been extended another day for the third annual Ash Dunning Memorial Trophy golf tournament set for October 24 at San Clemente.

NRC Commissioner Dick Teel (of the sponsoring Nortronics - Hawthorne group) advises entries will be accepted through the end of the first shift tomorrow. Contact Personnel Activities.

Starting at 10:45 a.m., this event will be a partner's best ball tournament with established handicaps required.

* * *

Model Plane Pilots Slate Competition

Model Airplane "pilots" will gather October 31 for an NRC-sponsored contest. Events begin at 9 a.m. and scale judging at 10 a.m.

Activities are centered at the EL Segundo "sand lot," just north of El Segundo Blvd. between Douglas Ave. and Pacific Coast Highway.

Action will include contests for free flight, radio control, scale gas and rubber-powered planes, according to NRC Commissioner Earle L'Homme.

Transtage Fails To Release OV2

Northrop's space environment sensing OV2-1 satellite was launched on a development flight of the second Titan III-C space booster from Kennedy Space Center last Friday.

The OV2-1 was pre-programmed to be released from the nose of the launch vehicle upon completion of the third "burn" of the transtage's engine. (The transtage is the final powered section of the launch vehicle, upon which the OV2-1 rode as a bonus payload).

A malfunction apparently caused the transtage to tumble after the second burn, however, and the third burn was not completed.

The OV2-1, because of operational requirements, cannot operate under its own power until proper separation from the transtage. Thus the satellite is apparently still circling the earth at an altitude of some 400 miles affixed to the Titan transtage.

NRC Gem Clubs Set Joint Field Trip

Northrop Gem and Mineral Clubs from Anaheim and Hawthorne will join forces this coming weekend for a field trip to the Boron Castle Buttes area.

The campground gathering point is in an unimproved area with participants required to bring water, firewood, etc.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 19 | November 3, 1965

KARIN APPOINTED TO ANAHEIM MUNITIONS POST

Bert Karin, a veteran of more than 15 years in munitions development work, has been named to a new post as Munitions Production Program manager at Nortronics Anaheim.

The appointment was made by Frank W. Lynch, Nortronics vice president and manager—Operations. Mr. Karin reports to Mr. Lynch.

Mr. Karin joined Northrop in 1962 and has served as chief of the Munitions Development group at Anaheim. Prior to joining Northrop, he worked for 12 years at the U.S. Army's Picitinny Arsenal and was laboratory chief, Warheads and Special Projects. Mr. Karin also worked for the Curtis-Wright Aeronautical Division and for four years taught engineering subjects at Fairleigh-Dickinson University.

Mr. Karin holds mechanical engineering degrees from City College of New York (bachelor's) and Columbia University (master's).

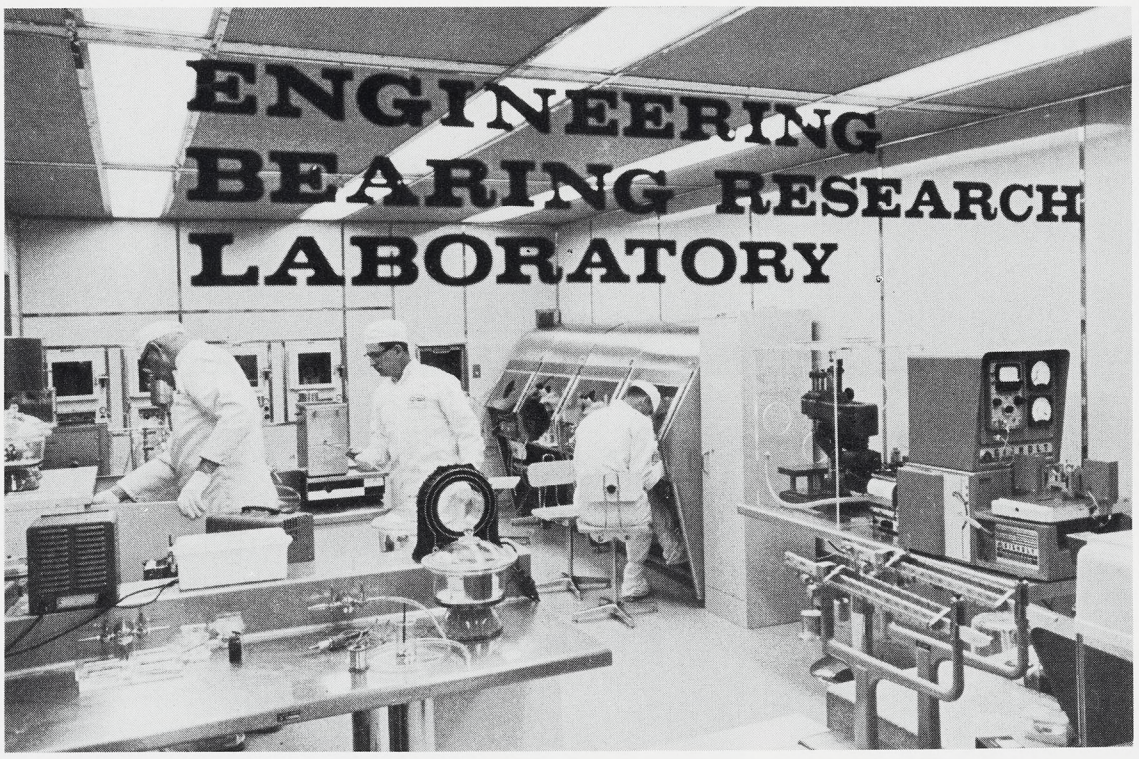
Among honors won by Mr. Karin for his long career in munitions development is the Department of the Army Decoration for Meritorious Civilian Service, the second highest award the U.S. Army can bestow upon a civilian employee. He received this decoration July 30, 1965 in recognition of his contributions on the Selected Ammunition Program from 1957 to 1962.

NRC's Holiday Dance Set for December 11

Northrop Corporation's annual NRC Holiday Dance, sponsored jointly by Northrop Recreation Clubs, will be held December 11 this year.

Les Brown and "his band of renown" will provide the music and International Hotel the ballroom. Further information will be available November 17 in NORTHROP NEWS.

BIRTH OF A GYRO



Research laboratories of Nortronics Precision Products Department at Norwood, Massachusetts, have played major role in Department's strength in inertial sensors market.

PPD has acquired an estimated 30 percent of U.S. competitive market for gyroscopes, and is achieving a 20-25 percent annual growth.

Controlled Landing Contract Awarded

A contract for development and test of a new controllable gliding parachute designed for pinpoint landing of manned space vehicles has been awarded to Northrop Ventura by the National Aeronautics and Space Administration.

NASA's Manned Spacecraft Center at Houston has announced the contract is part of a program to select a controllable parachute for test application with an Apollo type vehicle.

The basic landing device for Apollo spacecraft, a cluster of three 83-foot Ringsail parachutes, already is in the advanced development and test stages at Northrop Ventura.

The NASA contract calls for development and flight test of a Cloverleaf parachute approximately 50 feet in diameter for recovery of a one-half scale (5000-pound) vehicle.

AEROSPACE EXPLORERS LAUNCH P.V. PROGRAM

Youths from Palos Verdes and Rolling Hills high schools will meet at Research Park for the first time later this month as the newly formed Nortronics Aerospace Systems Explorer Post.

The special interest post will receive the support of management and engineering supervision, giving some 30 youngsters insight into the workings of an aerospace corporation.

Convening at Nortronics Palos Verdes last week, the policy committee and advisors for the post heard Mike Hoover, district executive of the South Bay District, Los Angeles Area Council of the Boy Scouts, explain the appeal special interest scouting holds for boys from 14 through the last year of high school.

Special interest exploring introduces boys of high school age to the inner workings of business and industry. It was launched three years ago in Orange County by the Boy Scouts of America.

Ross Miller, vice president and manager of the Technical department, Nortronics, welcomed the opportunity for the explorers and Nortronics to take a good look at each other.

Mr. Miller, chairman of the organizational meeting, emphasized the program's potential impact on the youth of the community and promised the division's full support.

Members of the Nortronics post policy committee are Mike Turney, director of Space and Information Systems; Lloyd Balsam, assistant to the manager of the Technical department; Dave Conklin, director of Tracking and Display Systems; Elmer Noonan, director of Industrial Relations; and Roger DiJulio, program manager, Overhead Technical Activity.

George Richards, supervisor of Personnel Administration, Nortronics Palos Verdes, is post coordinator.

Unit advisor will be Gordon Click, supported by three associate advisors, Jim Gisbrecht, Jaime Oaxaca and Doug Moore.

Other participating engineering supervision includes Marty Finkel, Roland Gagon, Bill Hale, Dwight Hawley, Norm Laverty, Floyd Priest and Fred Safford.

VAUDEVILLE WAS FIRST

Alice Bassett Ready for Third Career

With 30 years of show business and another 17 years at Northrop behind her, Alice Bassett still isn't ready for retirement.

As a singer and dancer when vaudeville was one of America's top sources of entertainment, Miss Bassett worked the big circuits—including Pantages, Schubert and Publix—dancing and singing old favorites like "That's My Weakness Now," "Back in Your Own Backyard," "If I Could be With You," and "There's a Small Hotel."

She appeared in nightclubs and restaurants in most of our major cities. She sang and danced as a single and with a partner, Ted Norris, and she performed in nightclub acts.

With Northrop she has been a timekeeper since 1948, currently at Nortronics Palos Verdes.

Along with her timekeeping, beginning at Plant One in Hawthorne, she's had time to patent a travelling bag for pets that allows them to keep their heads free.

Show business is known for its breaks, good and bad, and one of Miss Bassett's big ones came when she auditioned for a role to be performed on the stage of Grauman's Chinese Theatre.

There was to be a live prologue to the sound motion picture spectacular "King of Kings," including five tableaus or living pictures.

They needed people familiar with church music and who could pose gracefully in the tableaus. The requirements might have been written with her in mind.

In Minneapolis, Minnesota, Miss Bassett had sung lyric soprano in the Gethsemane Episcopal Church choir, studying for five years under the direction of J. Austin Williams. Also in Minneapolis she had belonged to Seton Guild, a parochial girls club specializing in dance training. There she studied ballet and tap.

So Miss Bassett performed in the 60-voice chorus for the "King of Kings" prologue. The group sang the Hallelujah Chorus from Handel's Messiah, and she did the role of the Madonna in a manger scene and in portrayal of the flight into Egypt.

"It's been a long time since I've talked about that part of my life," Miss Bassett said.

(See VAUDEVILLE, page 6)

Adult Square Dance Class Remains Open

Adults interested in learning square dancing have two more nights in which to join an NRC-sponsored class meeting Thursdays at 7:30 p.m. at Hill's Rancho, 15701 Crenshaw Blvd.

New students may enter November 4 or 11.

Contributions To Charity Up 24 Percent

An increase of 24 percent in participation and 43 percent in contributions was achieved during the recently conducted AID-NORAID campaign at Northrop Corporation.

This drive, which included Corporate, Northrop Norair and Northrop Nortronics (West Coast) operations, offered personnel an opportunity to support health and welfare agencies through systematic payroll deductions.

Increases noted were a result of tabulation of campaign cards turned in at the conclusion of the drive. Additional cards are still out for employees who may have been on leave, travel or special assignments. They will be tabulated upon receipt and the results added to the over-all figures.

When volunteer solicitors began contacting employees at the beginning of the drive, some 6404 employees were already supporting the AID-NORAID program. Their weekly contributions were $3766. At the conclusion of the drive the number of participants had jumped to 7959 for an increase of 1555. More, the pledged contributions jumped to $5411 per week or an increase of $1644 per week.

Thus, on an annual basis, Northrop employees have pledged an additional $80,000 to support the many agencies through AID-United Givers as well as Northrop's in-plant charity program, NORAID.

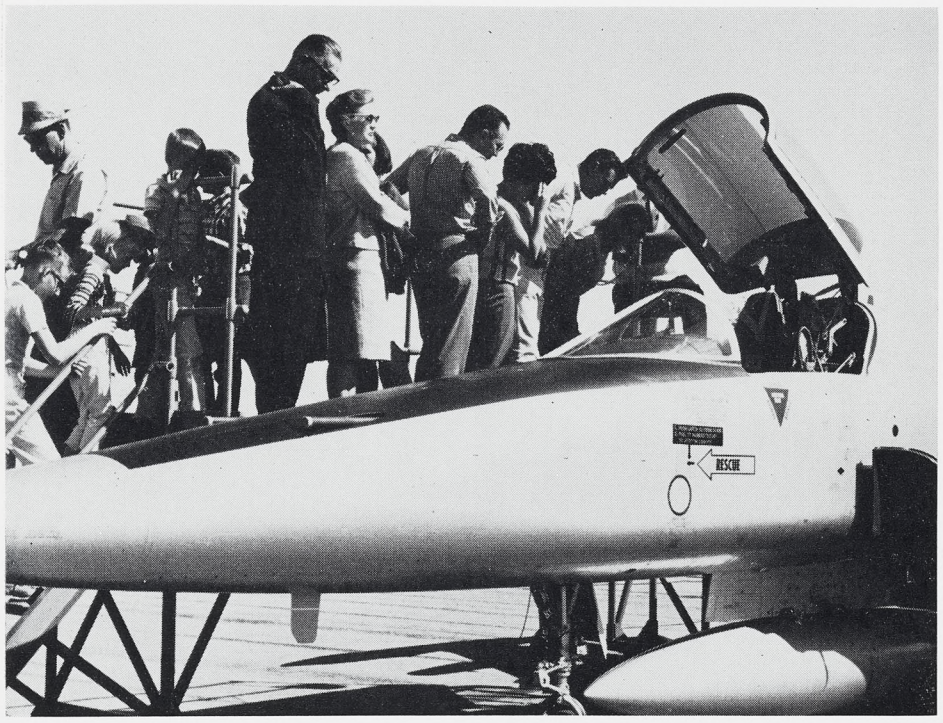
1966 Automobiles May Be Purchased At Discount Rates

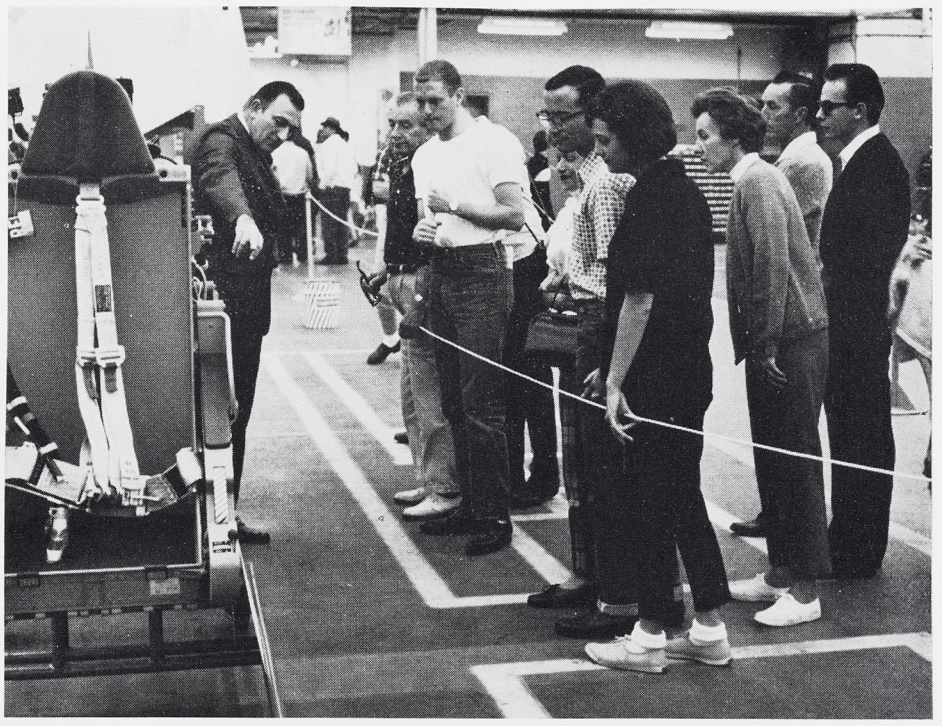
Northrop Corporation employees may purchase 1966 automobiles at fleet discount prices through a unique arrangement called the fleet discount purchase plan.

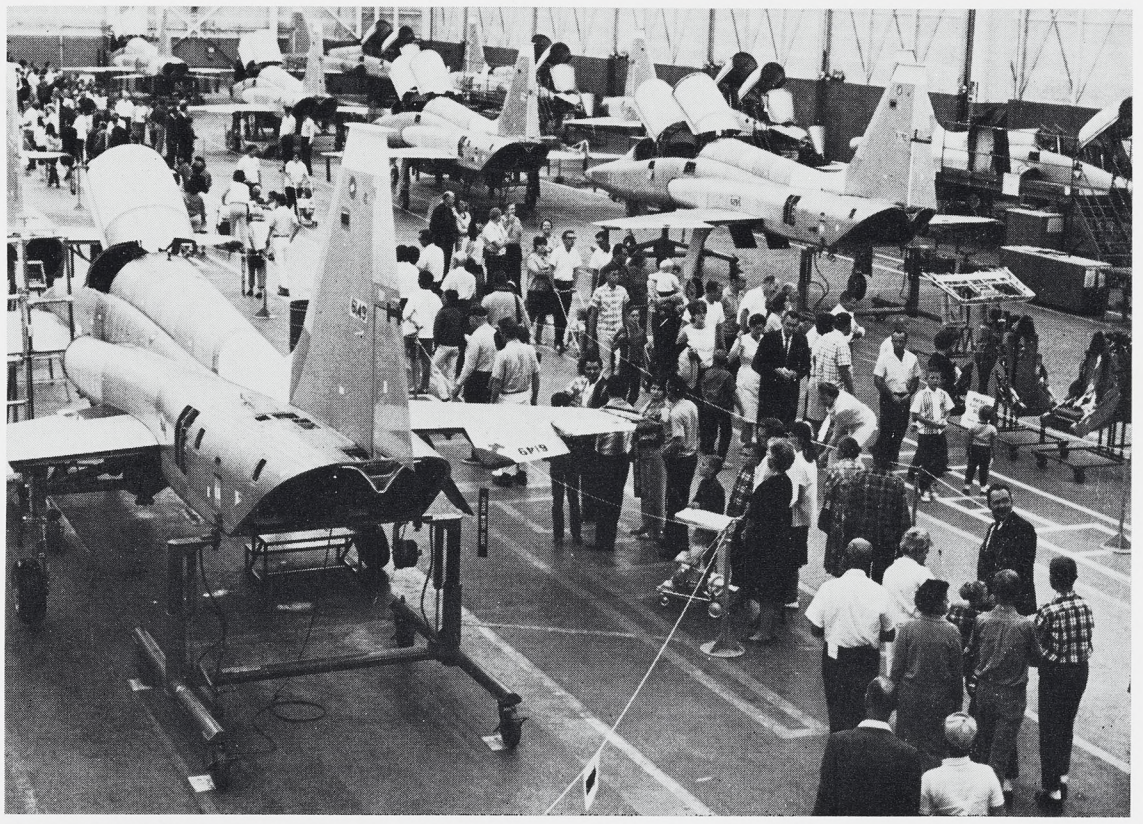
A reference manual, listing car dealers taking part in this plan is currently available at various locations. Buyers may check this manual for listings of nearby dealers and obtain a reference card prior to making appointment with the dealer's fleet sales manager. In addition to the purchase of the car at fleet price, optional equipment is also available at cost.

The reference manuals may be consulted and cards obtained at the following Northrop locations: Norair and Nortronics Hawthorne, Personnel Activities at Plant One; Ventura, the Credit Union office; Nortronics Anaheim, Personnel Activities; Mariposa, Polly Middleton; Palmdale, Tom Post; Edwards AFB, Kelly Burke; NSL, Personnel office (Kate Russell); and Arlene Lewis, Corporate office.

Automobiles purchased through this plan may be financed through the Credit Union.







ANTELOPE VALLEY AVIATION DAY

Northrop Norair's Palmdale facility was host last month to approximately 6,000 men, women and children during a half-day open house for Northrop employees and their families held in conjunction with Antelope Valley Aviation Day. Afternoon activities centered around air show which attracted 60,000 spectators. Topside view of F-5 (above) was offered by outdoor static display at air show. Seats (top right) manufactured at Northrop Ventura were part of display in Northrop assembly area, as were bottom photos of F-5/T-38 final assembly line.

BUT NOT AN ASTRONAUT IN SIGHT

Houston Space Port: A $130 Million Man-Machine System

By MAIDA EWING

EDITOR'S NOTE: As the Gemini and Apollo programs progress, the Manned Spacecraft Center at Houston is becoming the focal point of the U.S. interplanetary exploration project. When Northrop Ventura's Ed Ewing, inventor of the parachute which has returned all astronauts to earth to date, was invited to be the first industry man to address a NASA technical symposium, we asked Mrs. Ewing who accompanied him, if she would share with all Northrop employees her impressions of America's newest edifice to science and technology. Mrs. Ewing is Living Page editor of the Conejo News.

A room where "space" comes down to earth . . .

A field where astronauts practice walking on the moon . . .

A color screen television area where charts are chalked up in different hues to show where America's astronauts are in space . . .

A charting area with a floor full of wires that keeps track of two men in space, their heartbeat, blood pressure, every flick of their eyelid and twitch of their cheek . . .

And a computer system that is linked with TV cameras into the world's most complex system of tracking.

That's what they've built at the National Aeronautics and Space Administration's Manned Spacecraft Center near Houston, Texas.

It is almost too much to believe. But I saw it, and it's all true.

Our tour began with a bird's eye view of NASA's 1628 acres from the top of the Administration building. Only 15 percent of the land is occupied at the present time, with five new buildings in various stages of construction; massive modern structures surrounding three man-made lakes where ducks and swans swim undisturbed.

From the lobby of the auditorium, where the Mercury 7 spacecraft holds a position of honor and colored photographs of earth line the wall, we were taken to the Mission Control Center building for a practice run of a launch of Gemini 6.

Seats in this plush third floor viewing room are occupied by top brass during flight times. Today the Minister of Defense for Nationalist China and his entourage arrived for the practice run.

Major Henry E. Clemens briefed us first by pointing out the Control Center is laid out essentially the same as the controls in the spacecraft.

At consoles, experts in their field man these controls with backup experts, much like branches on a family tree, in rooms on both sides of the Control Center. On two big wall screens, the spacecraft is following in its flight path.

About here NASA Flight Director Chris Kraft took over and explained that there were seven projectors behind the screens and different colors used to denote various information items, i.e., a blue line for night side operation and a red for daylight. TV channels were constantly routing information, changing the master screens moment by moment.

"This building represents one-half the cost of the entire facility," Mr. Kraft said, adding that more than $130 million was invested in it.

The facility contains a complete weather station cable which provides weather stateside and for any earth weather, but aside from that they are also working to provide space flight weather information.

Mr. Kraft said the five IBM computers we had a peek at later, make up the largest computer complex in the world. Our guide told us this system would soon be replaced by a yet more complex system, at no additional cost to NASA which rents the equipment from IBM.

"The television system is our means of getting all the information before the people that must make the decisions, and we try to make all of them in this room," Mr. Kraft said.

He added that the television-computer system was very complicated . . . "We are just beginning to learn how to use it. It has been an experiment that has made our job a great deal easier."

Pointing out that by automating —taking the human element out of controls, they have to be sure it is right. "We have a wonderful tool, but must have the confidence that the program will give us the proper information and the right answers," Mr. Kraft said.

Next stop was the second floor of the Control building where we

(See HOUSTON, page 3)

ARTIST'S CONCEPTION OF MANNED SPACECRAFT CENTER

BRIG. GEN. RILEY TAKES COMMAND OF NEW AF UNIT

Brigadier General Daniel E. Riley has assumed command of the Air Force Systems Command's newest division—the Air Force Contract Management Division with headquarters in Los Angeles.

This is the parent headquarters of the Air Force Plant Representative office located at Northrop Corporation which is commanded by Lieutenant Colonel Rufus K. Keeling.

The Contract Management Division coordinates and directs the activities of nearly 4000 Air Force personnel stationed at 33 locations across the nation, Colonel Keeling said. They man AFPR offices, like the one at Northrop, located at 22 major aerospace contractor's plants. In addition, there are five test site offices at important test centers and at the Air Force Missile Development Center at Cape Kennedy, Florida and five contract support detachments assigned to missile launch sites where contract work is in progress.

The AFCMD is one of nine divisions under the Air Force Systems Command, General B. A. Schriever, commander.

NSA Chapter Names Reynolds Speaker

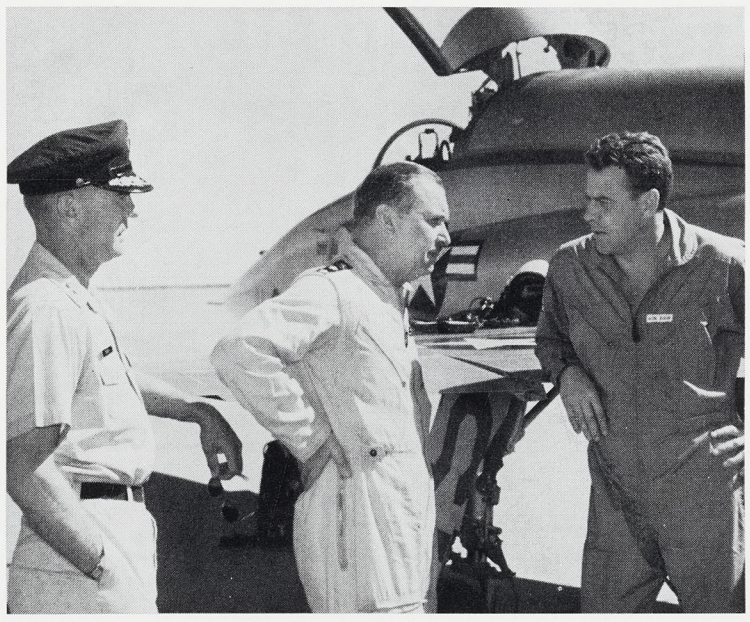
Vern Reynolds, supervisor of the Northrop Norair Communication and Supervisory Training branch, will speak at the Twin Harbor chapter, National Secretaries Association, meeting November 16 at the Plush Horse Restaurant, Redondo Beach.

Mr. Reynolds will discuss day-to-day spoken and written communication in a speech titled "Do They Really Understand You."

Reservations for the 6:30 p.m. meeting may be made through Rita Harris, ext. 2436, or Lee Ober, ext. 1395. All reservations must be made by November 12.

Total cost is $3.50 per person, including dinner.

FIGHTER DISCUSSIONS



Lieutenant General James Ferguson (center) Air Force deputy chief of staff for research and development, recently flew a Northrop F-5 in evaluation at Edwards Air Force Base. Pre-flight briefing found him discussing fighter with Major General Irving L. Branch (left) Air Force Flight Test Center commander, and Bob Elder, Norair director of Flight Operations.

HOUSTON: Where Neither Man Nor Machine Can Afford to Err

(Continued from page 2)

were told the total length of the wires under the floor was sufficient to stretch to the North Pole and back.

Also on the second floor was the biomedical laboratory with a TV hookup to the flight surgeons' console upstairs. Through telemetry the myriad of wires attached to the astronauts send signals back to earth and are recorded on wide paper tapes by oscillographs. If anything unusual comes through from the heartbeat, lungs, etc. the operator can tear off the sheet, place it under the television camera in the corner of the lab and it is picked up upstairs at the chief medic's console.

"There is so much medical history on the astronauts," we were told, "that we can tell when an astronaut is going to get sick before he knows it himself."

After a glimpse of the IBM room, roughly the size of a commercial airplane hangar, we visited the huge, high-ceilinged, black painted room where the astronauts practice rendezvous and docking with the Gemini and Agena space vehicles.

There, on frictionless gliders to allow no feeling of motion, with lights in the ceilings simulating sun spots, and nothing but pseudo-space all around, the Gemini guided by astronauts slowly meets the Agena and becomes one vehicle. The space experiment will be to connect the two and use engines, rocket fuel and instruments in the Agena to perform various experimental operations in space.

The rest of the buildings were either in use, being readied for the Gemini 6 flight scheduled October 25, or were out-of-bounds to us earth mortals. The very cool air conditioning everywhere we were told was "for the benefit of the computers, mere humans can shift for themselves."

From the frigid temperatures we were taken into the sunlight to the lunar landing area where a full-scale mockup of the moon landing craft sat boldly against the sky.

A narrow boardwalk led us out into the area over a slag strewn landscape imported in hunks and pieces from Pennsylvania.

There, amid man-made craters, water filled, we were told the astronauts train for moon walking. Cranes are brought out to the area and suited astronauts are attached together with a set of counter balances and weights, to simulate one-sixth gravity such as will be encountered on the moon. Here they become accustomed to "walking," propelling themselves with air guns and learn how to take "samples" of the moon terrain.

This was by far the most exciting part of the tour, science fiction nearly a reality.

The fact that NASA has between 3500 to 4000 employees, with an additional 3000 there under contract from various firms, and another 1000 engineers expected to be added within the year, may account for our not seeing one astronaut. However, we learned Nassau Bay people find them "really wonderful people."

ALL-NORTHROP DAY SCHEDULED AT FAMED UNIVERSAL STUDIOS

Northrop Recreation Clubs have joined forces to book an exclusive all-Northrop day at the famed Universal City Studios November 20.

The gates will open to Northrop ticket holders at 9 a.m. and close again at 6 p.m.

Special group rates will prevail with tickets now available through all Northrop ticket outlets. The savings is $1 per ticket, because of NRC's sponsorship. Rates are $2 for adults and $1.25 for children seven through 11 years. Children under seven, accompanied by an adult, will be admitted free. There are no other charges, except for food, refreshments, etc.

NRC has planned special Northrop Day at Universal Studios where special effects like this will be common. Activities include tour of movie and TV-making facilities, plus other features. Tickets are now available through NRC outlets.

Normally, a tour of all sights at this actual motion picture and TV production center requires about four hours.

Northrop families may ride comfortable "Glamor-Trams" to tour the vast 410-acre lot, viewing sets depicting scenes from around the world, lakes, harbors, etc., property warehouses, sound stages, stars' bungalows and other attractions.

Later, on a studio tour, they may see how motion picture illusions and special effects are created; the "Munster" house; Pavilion of Glamour (makeup); Action Arena; and actually be a part of a man-made snowstorm.

All of Universal Studios' many attractions will be available throughout the day. However, the final "Glamor-Tram" will depart at 3:40 p.m.

Special brochures outlining the many attractions have been printed just for NRC members and may be obtained at ticket outlets.

FRINGE BENEFITS

More About Insurance

by WILLIAM LARRABEE
Vice President—Industrial Relations

In my last article I said that I was going to talk some more about our group insurance program.

If I were to go into each benefit in detail I would need a special edition of the Northrop News. We have our hospital coverage, our surgical coverage, our major medical benefits and our long-term disability policy which I talked about in the last issue. We have our various life insurance programs, special accident benefits, retiree coverage, and business travel policies. Many of these are extended to dependents. All of them make up a fine group insurance package for the benefit of our people and their families.

Insurance coverage is not an easy thing to understand. Insurance companies seem to write their policies in the most complicated language. Nonetheless, each of us should study his certificates carefully because the policy provisions are controlling as to all of us. In the event we are not clear as to the meaning of our policies, we have available to us a Group Insurance booklet included in Working With Northrop. Sometimes, as now, the booklet falls behind because of changes in the plan so we should watch the various announcements which come out from time to time.

When in doubt, we can always ask questions of people like Mrs. Elaine Pillar. Mrs. Pillar came with Northrop in 1952 and has worked in group insurance ever since. She was recently made a supervisor, reporting to Mr. William Waldon. One of the coffee companies has an ad that goes something like, "What Mr. Chase didn't know about coffee, Mr. Sanborn did." In our company, what Bill Waldon doesn't know about group insurance, Elaine Pillar does.

Once we have learned as much as we can about our group insurance we should keep several things in mind. In the first place, I cannot stress too strongly the need for letting our families know what coverage we have. The fact that we have protection gives our wives or husbands and our children a sense of security and they should know what to do in the event we die or are disabled. Secondly, we should always be sure that we use our coverage to the best advantage. One of our people presented a claim quite recently covering his doctor and hospital bills after an operation. He did not realize that under his policy he was eligible for payments on account of post-operative prescription drugs.

Mrs. Pillar

Fortunately, Bill Waldon found out about this as the claim was being prepared and got the man over $300 which he did not realize was covered. The lesson to be drawn from this is that when talking with Bill's people, we should tell them about all of our expenses. If something is not covered, they will tell us, but they can't help us collect for something they know nothing about. In the third place, we should always have in mind the need for keeping track of the beneficiaries we have named under our policies.

We had a recent situation where an employee named his wife as beneficiary, was subsequently divorced, remarried and then died, without changing his beneficiary. The second wife did not appreciate the resulting problem. Fortunately, this does not happen too often, but changes in family relationships, additional children, etc., dictate consideration of possible beneficiary changes.

Finally, each of us should look at our group insurance in the light of his own individual needs and problems. Certainly, some of us need more life insurance than others, particularly where we have children going to school or a mortgage on the house. Perhaps some of us should have our life insurance payable in installments to make sure that a child has continuing funds for his education or where a widow needs income rather than a lump sum. Some of us may wish life insurance for our dependents or may wish to have our dependents covered by our major medical policy.

Those of us who travel for the company should be familiar with the company's accidental death and dismemberment travel policy. Very few of us know that this covers us while traveling on company business, even on such trips as driving between plants. Some of us may find ourselves assigned to or passing through war hazard areas, such as Vietnam, India, Pakistan, Kashmir, or Santo Domingo. In that case, some of our group coverage is invalid and we must get ourselves covered by the special policy which the company carries for such people on company business.

Some of us may wish life insurance or medical coverage after retirement; others may not. The Northrop program has a good deal of flexibility built into it for the individual. We can get the most out of it by taking particular advantage of those provisions which meet our individual needs.

When I have covered more of our basic fringes perhaps I can get back to talking about some of our special coverages and some of the situations which have confronted our people. I am sure that I am going to wish to discuss some further improvements which are coming up shortly. For the present, however, I would like to close this group insurance phase of my discussions by summarizing a conversation which took place at the Corporate office the other day.

We were talking about which of our benefits was of the greatest value to the individual employee. It is hard to argue against life insurance, or accidental death and dismemberment, or travel coverage

(See FRINGE BENEFITS, page 5)

Miller Re-elected Vice President Of National NSIA

Robert R. Miller, Northrop Corporation senior vice president, has been elected to a second term as national vice president of the National Security Industrial Association.

Mr. Miller

Mr. Miller is also past president and a director of the American Ordnance Association, and a director of the Los Angeles chapter, Association of the United States Army.

Joining Northrop in 1951, he served initially as assistant to the vice president for Customer Relations. He was appointed senior vice president in July 1958.

Before coming to Northrop, Mr. Miller had been executive vice president and general manager of Menasco Manufacturing Company and an executive with Republic Aviation.

He is a graduate of University of California at Berkeley.

Kuehnegger Reports On Lunar Studies

Dr. Walter Kuehnegger of Northrop Space Laboratories described a portion of his studies on man's physical capabilities on the moon at the ninth annual meeting of the Human Factors Society at Dayton, Ohio, last month.

The meeting session was devoted to NASA research studies in reduced gravity simulation.

Dr. Kuehnegger's report was based on biomechanical and physiological data from simulated lunar gravity experiments conducted with the lunar gravity simulator at Hawthorne (see photos on this page).

* * *

V/STOL Symposium Hears Norair Paper

John Patierno and Haig Asdurian of the Aero and Propulsion branch, Norair, presented a paper today during the two-day first national V/STOL symposium of the American Helicopter Society at Wright-Patterson Air Force Base.

The technical paper deals with the "Impact of Control Provisions on Mission Performance of Jet VTOL Aircraft Using Reaction Control Systems."

MEETINGS

Northrop Executives in AIAA Meeting; ISA Aerospace Group Hears Ellet Analysis

ALOTS, FLIGHT SIMULATOR ALSO ARE FEATURED

Papers on an Airborne Lightweight Optical Tracking System (ALOTS) and a dynamic flight simulator and a keynote luncheon speech on the future course of the aerospace industry were among major Northrop contributions to the 20th annual conference and exhibit of the Instrument Society of America in Los Angeles last month.

Dr. Ellet

Northrop President and Chairman Thomas V. Jones was a member of the Sponsors committee which planned the conference and exhibit. Dr. Arnold O. Beckman, chairman of the board of Beckman Instruments, Inc., was chairman of the 44-member "blue ribbon" committee.

Dr. Alex Weir, technical advisor to the President, represented Mr. Jones at the awards banquet at which Northrop's contributions to the conference were recognized.

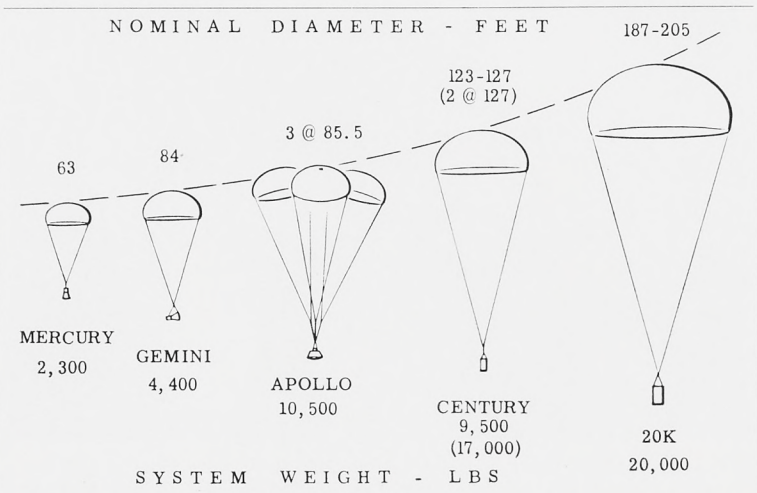
The luncheon address by Dr. William C. Ellet, Corporate director of Market Analysis, was a highlight of the three-day National Aerospace Instrumentation Symposium, held in conjunction with the ISA conference.

Dr. Ellet urged representatives of the aerospace industry to give more consideration to the "totality of public policy" and warned against the effect in the 1970's and 80's of the "tendency to concentrate our attention on individual national objectives without too much regard for the totality of goals."

Dr. Ellet went on to say that no matter who sits in the White House, his first consideration is the nation's security.

"We must of necessity view all other social and technical goals within the context of national security and its resource needs."

In light of the limitations on what the United States can and will do over the next two decades, Dr. Ellet predicted that strategic systems, missile, surveillance and communications systems, ASW research, V/STOL aircraft, and experimental programs will be among major defense expenditures.



EVOLUTION OF RINGSAIL—Northrop Ventura's Ed Ewing described the development stages of the Ringsail parachute, which has been the main landing chute of all manned spaceflights, to a NASA Technical Symposia last month. The Century and 20K chutes in above illustration are advanced developments.

Also active in the aerospace symposium were Norair's Hank Karaszewski, developer of a session of Aerospace Simulation, and Herbert D. Cooles, who presented a paper on Norair's dynamic flight simulator as a general purpose research tool.

"The role of flight simulation in research is not to train the pilot, but rather to use the highly skilled experimental test pilot as the primary measurement instrument in the determination of man-machine compatibility," Mr. Cooles said.

In using the simulator, an engineering test pilot sits in a moving cockpit mockup. He flies the vehicle by sensing the motions of the simulator, watching a moving external visual display and observing variances in the cockpit flight instrumentation, just as he would in normal flight.

The pilot's use of controls during the simulated flight are automatically fed into an analog computer which in turn signals servo drives of the cockpit, external displays and flight instruments to make the appropriate changes in conditions.

The result is a closed loop around the man-machine system.

At the same time the Aerospace Symposium was in progress, a general session on Optical Techniques for Airborne Instrumentation was hearing four papers by Northrop Nortronics specialists.

David E. Conklin, director of Tracking and Display Systems section at Palos Verdes, gave a general description of ALOTS, developed for the Air Force Eastern Test Range.

James F. Lynch and Fred A. Clark of Integrated Systems at Palos Verdes, discussed a recent experiment with ALOTS, the airborne tracking of Echo I satellite. James H. Gisbrecht presented a paper on electro optical sensors for guidance and attitude control, and Applications Engineer Robert L. Rodgers discussed future airborne instrumentation systems.

ALOTS is designed to provide high resolution photographic coverage of missile and spacecraft launch vehicles during launch as well as re-entry. Attached to a C-135 aircraft, the system can provide all-weather tracking by flying above cloud layers which, in the past, have forced postponement of launches.

Northrop also chaired a session on Non-Defense Metrology Requirements.

JONES, HORNER HAVE KEY ROLES IN L. A. SESSION

Northrop Corporation executives will have key roles in the November 15-18 AIAA Aircraft Design and Technology meeting at the International Hotel.

Thomas V. Jones, Northrop president and chairman, will be the principal speaker at the November 16 luncheon session.

Richard E. Horner, Corporate senior vice president and Norair general manager, will be chairman of the opening session on Advanced Precepts of Aircraft Technology. Mr. Horner is national president of the American Institute of Aeronautics and Astronautics, sponsors of the meeting in conjunction with the Royal Aeronautical Society of Great Britain and the Japan Society for Aeronautics and Space Sciences.

Welko Gasich, Norair vice president and assistant general manager — Technical, will deliver a key paper titled "The Northrop F-5, a Unique Concept in the Military Assistance Program" at a Management session to be conducted by Milton Kuska, Norair deputy assistant general manager-Technical.

Darrell L. Hirsch, Norair member of Technical management, will present a paper on "Experimental Investigation of Pilot Behavior in a PIO Situation" at a session on Guidance and Control.

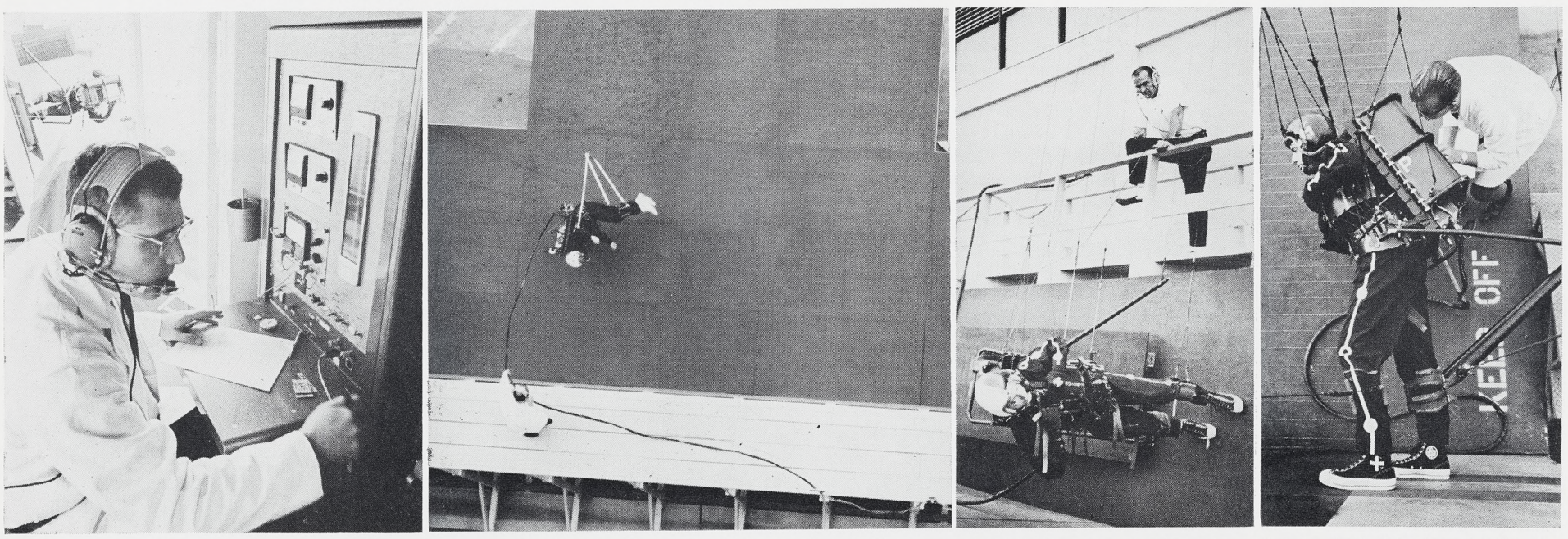
Heading various committees during the meeting will be Northrop's Charles Eyres (administrative chairman), Leo Gay (field trips), Henry Olivier (membership), and Curtis Burdett (international liaison).

Plans call for participants to visit Northrop Norair, one of four selected field trip sites, at 9 a.m., November 17.

NORTHROP NEWS
Vol. 23 No. 19
A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

It's a Half Way Upside Down World for Lunar Gravity Researchers at Northrop Space Labs



Latest moon walk experiments by Dr. Walter Kuehnegger and staff at Northrop Space Laboratories make use of five-story lunar gravity simulator installed at Hawthorne early this year. Hanging from 63-foot cables, subjects walk along treadmill or walkway tilted only 9½ degrees from vertical. Effect is as if he were walking in lunar gravity, one sixth that of earth's. In first photo, Frank Rizzo, biologist, monitors test walk and collects data from sensors attached to human subject (upper left). Second photo shows Dr. Kuehnegger doing somersault as preliminary check of equipment while Jim Schuessler, electronic technician, keeps instrumentation umbilical line clear. In third photo, Mr. Schuessler times walk, while monitoring physiological changes. In last photo, George Fitzgerald, test subject and Cal State at Long Beach student, dons current type simulator harness while Ted Martin, laboratory technician, reads respirometer within backpack.

Classified

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Tempest, 1962, 4-cyl., convt., $950. Fullerton, 871-3805. A

Jeep station wagon, 1959, 4 wd, 1-owner, $1200. Torrance, FR 8-1350. A

Mattress & box springs, twin-size, box springs mounted on wooden legs, $15. Hawthorne, 676-3575. A

TV, 21″ Packard Bell, table model, mahogany wood cabinet, $25. L.A., PL 6-0015. A

House Trailer, 17′, sleeps 4, elect. & butane icebox, stove, 12 & 110 volt lights, $1350. Gardena, OR 7-3884. A

Pennies, 1 bag, 100 rolls, circulated common date "s" mint, $75. Torrance, DA 6-5558. A

Casement Windows, 2, 3′ x 4′, screens incl., $10. Torrance, 320-3440. A

Chevrolet, 1958, auto. trans., new tires, A.R.C. record player, $600. Montebello, 722-7680. A

Pickup, ½ ton Chevrolet, 1964, r/h & camper, $1550. Torrance, FA 8-5565. A

Boat, 14′ glassed, Mark 20 motor, trailer, spare tires & tubes, life jackets, $200. San Pedro, TE 1-3483. A

Chevrolet, 1958, Del Rey, floor stick shift, $350. Redondo Bch., 374-2433. A

Ski Boat, 14′, 1965 100 hp Mercury motor, trailer, $1500. Hawthorne, OS 5-1684. A

TV, Packard Bell, black/white, 21″ screen, walnut cabinet, $125. L.A., 645-6815. A

Bedroom Set, French provincial, dresser, chest of drwrs., mattress & spring, $350. Gardena, DA 4-8042. A

Chevrolet, 1953, convt., stick shift, tonneau cover, $250. Torrance, 327-4585. A

Trailer, 21′, modern, located in a 4A trailer park on east fork, San Gabriel River, 40 miles from L.A., $1200. Torrance, 325-8211.

Chair Set, 2, aquamarine, on Shephard casters, loose pillows, $100. Inglewood, OR 4-7743. A

House, 2-bdrm., attached comb. gar. & game room, built-ins, 15′x30′ pool, 5 min. to Norair, $22,950. Gardena, DA 9-4447. A

TV, RCA 21″, $40. Inglewood, 674-2997. A

Chevelle, 1965, Malibu super sport, 327 cu. in., 350 hp, 4-spd., 7500 miles, $2600. Hawthorne, OS 6-9736. A

Ford, 1956, V-8 sedan, r/h, p/s, auto., near new tires, brakes, etc., $295. Buena Pk., TA 8-2857. A

Volkswagen, 1964, model 117, sunroof, radio, seat belts, many extras, $1495. Manhattan Bch., FR 6-1395. A

Bicycle, ladies′ 28″ wheels, $8-$10. Buena Pk., LA 1-4711. A

Go-Kart, $50. Inglewood, PL 6-7681. A

Corvette, 1964, AM-FM radio, 2 tops, positrac., 4-spd., 300 hp, $3100. Anaheim, 776-4969. A

Range, O'Keefe & Merritt, gas, griddle, auto. clock, controlled oven, $40. Hermosa Bch., 374-5721. A

Pickup, 1958 Ford ½-ton, Fordomatic, r/h, w/s/w, new paint, $545. Torrance, 377-3636.

Hi-Fi console, radio-phonograph, $60. Hawthorne, 676-0418. A

Ice Skates & Shoes, ladies size 7, $20. Hawthorne, 675-1057. A

Boat, 12′, Fibreglass, 7½ hp motor & access., mounted on trailer w/lights, $250. Hawthorne, OS 5-3866. A

Morgan, 1960 super sport, all alum. body, tonneau & top. British radio, heater, many extras, recent tuneup, $1495. Santa Ana, LI 4-6135. A

Corvette, Sting Ray, 1963, soft & h/top, r/h, 4-spd., 4:11 posi., p/w, Jardine headers, many extras, $3400 or $3250 w/out soft top. La Habra, 691-9534. A

Trailer, custom-made, 6′x5′, hvy. duty car frame hitch, $60. Fullerton, LA 6-1569. A

Rug, genuine Lillihan Oriental, 9x12, $100. Portuguese Bend, FR 7-5370. A

Corvette FB, 1963, 4-spd. trans., 340 hp, r/h, $3100. Gardena, 329-3469. A

Piano, Starr console w/bench, mahogany, $400. Torrance, 323-1698. A

Couch, 8′, modern, brown & gold stripe, w/club chair & ottoman, aqua, $110. L.A., 876-8712. A

Trailer, Sierra Camp, 11′, foam bunks, 12-V elec. lights, other extras, $300. Placentia, 714-528-3963. A

Snow Tires, 7:10x15, 2, near new, $20. Anaheim, 776-1374. A

Chevrolet Impala SS, 1963, stick, 8-cyl., $1595. Torrance, FR 8-7642. A

Chevrolet, 1950, 4-dr. sedan, heater, nearly new tires, $135. Torrance, 326-4379. A

Washer-Dryer, Westinghouse twin space savers, 25″x25″, 26″ tall, $100. Torrance, 325-9322. A

Plymouth, 1950, 2-dr., 1947 body, $60. Inglewood, OR 8-1633. A

Ford Fairlane 500, 1958, h/top, V-8, auto., r/h, needs work, $295. Inglewood, 673-1589.

For Sale

Pickup, 1957 ¾-ton Ford, $495. Manhattan Bch., 379-2649. A

House, 2-bdrm., modern, R-3 lot, near Inglewood shop. center, $25,900. L.A., AX 2-9489. A

Cabin Cruiser, 20′ Mitchell, 90 hp Johnson, trailer, radio, bait tank, low dn., $2400. Santa Monica, GL 4-7770. A

Accordion, 120-bass, Castle, $100. Torrance, DA 4-0649. A

Chevrolet Impala, 1959 4-dr h/top, auto., p/s, p/b, w/s/w, r/h, 38,000 act. miles, $875. Anaheim, 535-2663. A

Trail Cycle, 1965 Yamaha, street & trail gears, $300. Inglewood, 677-8456. A

Chevrolet, 1955, chrome wheels, custom steering wheel, $300. Torrance, 326-5517. A

Bicycle, boy's, 24″ Schwinn Tornado, $18. Hawthorne, OS 6-7766. A

House, near Disneyland, 4-bdrm., fam. rm., fireplace, lge. lot, $1000 below FHA, $27,900. Anaheim, 776-6291. A

Volkswagen, 1965, 11,000 miles, w/s/w, radio, $1700. Fullerton, 526-4168. A

Band Saw w/motor, Delta Milwaukee, 14″, $65. Arcadia, 446-1887. A

Ford station wagon, 1958, rebuilt motor, 4 new tires, $600. L.A., 775-7827. A

Dryer, Whirlpool, gas, $40. Torrance, FA 8-7989. A

Powerglide Transmission, rebuilt, 1957 Chevrolet V-8, complete, $40. Canoga Pk., 213-348-6037. A

Bicycle, 20″ girl's, $15. Downey, TO 1-6404.

Horse Trailer, single, $300. Torrance, 320-2389. A

Wet Suit, full-length, hood, fits men's size small, w/18 lb. weight belt, flipper slippers, & Cressi fins, $50. Lynwood, 632-2642. A

Ford, 1959, h/top, 401 cu. in., 4-spd. stick, Hydro., r/h, chrome wheels, Tri-Power carb., $975. Lynwood, 631-7745. A

Stereo, Shure, studio dynetic arm & N220 cartridge, $65. Hermosa Bch., 377-6966. A

Washer, Kenmore, 1960, lint filter, 2-spd., 14-gal., $40. Huntington Bch., 714-897-8201.

Austin Healey Sprite, 1962, convt., new brakes, tonneau cover, $1050. Buena Pk., 714-522-4313. A

VW sedan, 1965, 8000 miles, many extras, $1850. L.A., 474-9790. A

Chevrolet Impala, 1961, convt., p/s, p/b, r/h, good tires, $1300. Garden Grove, 894-1035. A

Lot, 67′x145′, view, level corner, $19,500. Inglewood, 454-2212. A

Hillman, 1958, 4-dr., low mil., $450. Hawthorne, OS 5-3080. A

Pickup camper, 1959 Ford & 10′ sportking camper, $1500. Los Alamitos, 596-4215. A

Mercury, 1959, Montclair cruiser, r/h, new tires & brakes, auto. trans., $550. Hawthorne, OS 5-1607 before 2 p.m. A

Surfboard, Bragg, 8′11″ 22 lb. wt., 3½ thick, redwood strip, $65. Hermosa Bch., 372-6755. A

Bicycle, 3-spd. English, 28″, boy's, $15. L.A., PL 4-0078. A

Thunderbird, 1959, $650. Inglewood, 675-5031. A

Wig, natural ash blond, 100% human hair, hand tied, adjustable, includes patent wig case, stand & spray, $130. Inglewood, OS 5-8390. A

Cabin Cruiser, 17′ Wizard, fiberglass, on trailer, 40 hp elec. start Evinrude, 5 hp aux., fully equipped. $1200. Monterey Pk., 282-0360. A

Speaker & enclosure, 12″ Utah coax in 15″ unfinished Carlson encl., $15. Anaheim, KE 5-6990. A

Honda, 150 cc, 1964, windshield, $325. Anaheim, 774-4117. A

Surfboard, Paul Hunt, $70. Anaheim, 528-2783. A

MGA coupe, 1959, r/h, $800. La Mirada, 943-6317. A

TV, 21″ Westinghouse, new picture tube, $50. Lawndale, 371-0194. A

Volkswagen, 1963, radio, $1225. Hermosa Bch., 372-5985. A

Refrigerator, gas, Servel w/crosstop freezer, $20. Torrance, 325-3724. A

Infant Seat, $3. Rolling Hills, FR 5-8536. A

Train Set, Tyco H-O, never used, $30. Inglewood, OR 2-2370. A

Bicycle, full-size, boy's Schwinn, 3-spd., hand brakes, $10. Long Bch., 596-1280. A

Hutch, Early American John Alden, 42″, $90. Hawthorne, OS 6-5921. A

Cookbooks, 3, $5. P.V. Pen., FR 8-1863. A

Cabin, 1-bdrm., 504 sq. ft., on 25′ x 100′ lot in Sugar Loft, Big Bear, $1500 dn., $1500 side note at $25 mo. & assume $4700 loan, approx. $63.87 mo., $8500. Torrance, 326-4075. A

Motorcycle, 1964 Triumph TR-6, $850. Inglewood, 674-1847. A

Dot, 1964, good dirt bike, $550. Lomita, DA 5-3494. A

Lot, ⅓-acre, near Colorado River in Arizona, electricity, water in, near boat landing, $1995. Burbank, 845-3363. A

Organ, Thomas, electronic, single keyboard, $175. Fullerton, LA 6-2071. A

House, 3-bdrm. & family rm., 1¾ baths, 1650 sq. ft., near Norair, $29,500. Gardena, DA 4-5342. A

Honda, CB 160, 1965, 1600 miles, $495. Manhattan Bch., FR 2-3458. A

Motorcycle, 1963, Yamaha, 80 cc, $200. Torrance, DA 4-8618. A

Chevrolet transmission, 1958-1963, 3-spd. w/Hurst linkage, $50. Hawthorne, 644-3501.

For Sale

House, near Northrop Ventura, 3-bdrms., 2-bath, custom, 2-yrs.-old, $21,900. Redondo Bch., 370-7130. A

Vespa, 1965, 16.2 hp, Grand Sport, 2000 miles, locked glove space, shield, $300. Lawndale, 676-5425. A

House, 3-bdrm., family rm., 1¾ baths, fireplace, h/wood floor, auto. open gar., sprinklers, 5-yrs.-old, $27,500. Gardena, DA 3-4693. A

Corvair Spyder, 1964, 20,500 miles, 4-spd. radio, $1595. L.A., PL 9-5991. A

Pups, doberman pinscher, 6-wks-old, 2 males, 2 females, AKC, $75 & up. Torrance, 320-5063. A

Sewing Machine, portable, Montgomery Ward, w/attachments, $25. Long Bch., GA 3-1363.

Pool Table, 8′ balls, rack, cues, $45. L.A., PL 9-7954. A

Washer, auto., Kenmore, 2-spd., 10 cycles, $65. Torrance, 371-6328. A

Organ, walnut, Silvertone, 3½ octave, 1-octave bass pedals, 15″ speaker system, $125. Hawthorne, 676-1971. A

Figure Skates, boy's size 4, Reidell boot, winter club blade, worn 3 times, $20. Norco, 735-1232. A

Buick, 1954, good mechanical condition, nearly new battery, less than 50,000 miles, $125. L.A., 476-1635. A

Kitchen Table Set, Formica, 6 chairs, beige w/gold, 72″ x 36″ full length, $55. Torrance, DA 4-0161. A

Paper Cutter, Michael-Lith, precision lever type ream cutter, $65. Granada Hills, 785-1771. A

Sofa, beige, w/matching living room chair, $50. Torrance, 323-6795. A

Range, elec., $75. L.A., 645-8288. A

Dresser, blonde 6-drwr., lge. mirror, $20. Hermosa Bch., FR 2-8019. A

Crib, mattress & guard rail ext., $18. Inglewood, 674-6395. A

Ford country sedan, 1957, V-8 station wagon, $250. Hawthorne, 644-1785. A

Ford Galaxie, 1961, 4-dr. sedan, T-Bird eng., p/s, p/b, auto. trans., new tires, 63,000 miles, $950. Rolling Hills, 831-9707. A

Wanted to Buy

Dog, must be ½ chihuahua & ½ Boston terrier, will pay up to $10. Gardena, 329-9484. B

Ford, stick trans., & Ford 292 eng. Inglewood, 755-1071. B

For Trade

Laundry Tray, double, for single. Hawthorne, OS 9-6982. C

Rentals Offered

Apt., 2-bdrm., unfurn., laundry, closed garage, walk to Northrop, $110 mo. Hawthorne, OS 5-3792. E

Apt., 2-bdrm., unfurn., fireplace, adults, no pets, $135 mo. Inglewood, 673-0401. A

Studio Apt., unfurn., 3-bdrm., pvt. patio, soundproofed, closed gar., near bus & schools, $175 mo. Torrance, FR 5-0867. A

Apt., walking distance of Northrop, 2-bdrm., 2-bath, large exec.-type, closed gar., $120. Hawthorne, 676-9620. E

House, 3-bdrm., 1-bath, fireplace, gar., yard, near schools, no pets, $175 mo. Redondo Bch., 375-3266. E

Apt., 2-bdrm., 10 min. to Norair, $100 mo. Redondo Bch., 370-9541. E

Apt., 1-bdrm., furn., pvt. deck, lge. pool, sub. garage, near Northrop, $145 mo. Lawndale, 377-4372, 679-7426. E

Apt., 2-bdrm., $115 mo. Hawthorne, OS 6-7417. E

Cabins, Lake Gregory & Crestline, sleeps 6, $25. weekends, $60 week. Venice, EX 1-2040.

Apt., furn., 1-bdrm., ground floor, rear, $85 mo. L.A. 295-9997. E

Apt., unfurn., 2-bdrm., 2 baths, laundry facilities, open garage w/storage space, children OK, hot water pd., close to Northrop, $125 mo. Inglewood, 672-5798. E

House, lease, 4-bdrm, fam. rm., 5 min. to Fwy, fenced, walk to schools, corner, $245 mo. San Pedro, 377-8856. E

House, 2-bdrm., 2-bath, semi-unfurn., $135 mo. Hawthorne, OS 9-7909. E

Rentals Wanted

House, 2-bdrm., on own lot w/garage, lge. yard, Inglewood, Hawthorne area, will pay up to $110 mo. Box 1901. F

House or Apt., 1 or 2-bdrm., Westminster or Seal Beach area, $80 max. Brea, 714-529-1436. F

Lost

Field Glasses lost Sun., Oct. 17 at Palmdale facility open house. Box 1902 or call Palmdale Tie Line, ext. 56. J

Personals

I would like to thank all the men in Dept. 5843, Nortronics, for their thoughtfulness at a time when it was deeply appreciated. MRS. LUCILLE JOHNSON. L

Share 3-bdrm., 1¾ bath home, w/lge. fenced yard, in quiet residential area with single woman or woman w/1 child, 2 miles from Norair. Gardena, 323-3245. L

Engineer wanted to share 1-bdrm apt., attending graduate school part-time. $50 mo. & ½ utilities. Hawthorne, 644-2592. L

For Sale or Trade

Duplex, near new, 2-bdrm. ea., built-ins, beam ceilings, disposals, $33,950 or trade for house or building lot. Hermosa Bch., 376-3857. M

Forklift Truck Training Reduces Accident Rate

Over the past three years operators of 51 forklift trucks utilized at Northrop Norair have chalked up a remarkable accident-free record.

This accomplishment is an obvious reflection upon the skills of the individual drivers involved as well as an unusual in-plant Industrial Training program which helped to develop them.

Prior to the installation of this program, Norair experienced an average of three forklift truck accidents per year, resulting in some personal injuries as well as costly damage to machine tools, equipment and general cargo.

Norair's Industrial Training branch with the assistance of the Safety and Fire Prevention branch formulated the program and has administered it. Some 150 operators have successfully completed the course and its final examination, earning Norair operator's licenses. Operators are re-licensed and updated annually.

Each participant spends a minimum of six hours in formal training. The course includes familiarization with safety rules and operating procedures. A significant part of the training consists of actual experience in operating forklift trucks in a closed course. The latter ranges from negotiating narrow aisles, tight corners, etc. through material handling, and other types of pre-operational checkout, including inspection of the equipment (i.e. brakes, fuel supply, etc.)

Paul Shuman of Maintenance has been qualified as an instructor and conducts the training for the Industrial Training organization on a loan basis.

Northrop Norair's 51 forklifts range in size from 2000 to 14,000 pound capacities. Each averages four hours operation daily over about 12 miles. The entire fleet logs something like 500 miles daily, 2500 miles weekly and 125,000 miles annually. They move an average of 50 tons of cargo daily or about 12,500 tons each year. Each load may range from a few pounds up to seven tons.

Roy Dietz Is Not Only One to Profit

There is quite a bit of "profit" being realized from Roy Dietz's ingenuity at Northrop Norair.

Mr. Dietz's share is $682 for an approved Suggestion Award. Employees in the Chem-Mill section have fewer tasks to perform. Norair is saving 2769 hours annually. Northrop's customers will get more airplane for fewer dollars.

A Manufacturing Control representative assigned to the Chem-Mill operation, Mr. Dietz noted many small parts (doors, panels, etc.) were being trimmed, masked, then the edges taped, then put through chem-mill processing.

He suggested chem-milling first with a number of individual parts on a single sheet of material. As many as 30 parts could be laid out on a single sheet. Next comes masking, scribing and etching before individual parts are trimmed to size. Eliminated was the taping of edges and individual masking, plus a drastic reduction in handling, layout, etch and basket loading time.

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7 a.m. — 3:45 p.m.

Prospect & 17th St., Santa Ana. North Tustin or east Santa Ana. Earl Eason, NSL, ext. 2655, 544-3639. 2

7:30 a.m.—4:15 p.m.

Van Ness Ave. & Redondo Beach Blvd., Gardena. Sandra J. Thornhill, Norair, ext. 2401, 324-7366. 3

Bloomfield & Imperial, Norwalk. Need ride for two. M. J. Swickard, Norair, ext. 2586. 3

Crescent & Dale, Buena Park. D. H. Eaglin, NSL, ext. 2655, TA 8-2857. 3

8 a.m. — 4:45 p.m.

Manchester & Airport Blvd., Los Angeles. D. J. Hall, Norair, ext. 1551, 645-6815. 5

Ball Rd. & Los Angeles St., Anaheim. Diane See, Nortronics, ext. 775, 772-3267. 5

Atlanta & Beach, Huntington Beach. M. H. Sabet, NSL, ext. 2807, 714-536-1621. 5

Simi or adjacent Valley area, Simi. Beverly Barnes, Norair, ext. 2603. 5

Kornblum & Rosecrans, Hawthorne. Catherine L. Duenas, Norair, ext. 2123, 679-6285. 5

Hollywood Fwy. & Silver Lake Blvd., Los Angeles. Jim Low or F. Almanza, Norair, ext. 1676, 2001, 664-6564. 5

Fairview & La Brea or Fairview & Eucalyptus, Inglewood. Louise T. McCulloch, Norair, ext. 2042, 672-2434. 5

Rides Offered

7 a.m. — 3:45 p.m.

Prospect & 17th St., Santa Ana. North Tustin or east Santa Ana. Earl Eason, NSL ext. 2655, 544-3639. 12

7:30 a.m. — 4:15 p.m.

Crescent & Dale, Buena Park. D. H. Eaglin, NSL, ext. 2655, TA 8-2857. 13

8 a.m. — 4:45 p.m.

Atlanta & Beach, Huntington Beach. M. H. Sabet, NSL, ext. 2807, 714-536-1621. 15

Hollywood Fwy. & Silver Lake Blvd., Los Angeles. Jim Low or F. Almanza, Norair, ext. 1676, 2001, 664-6564. 15

FRINGE BENEFITS

(Continued from page 3)

or, for that matter, any special benefit. Each is invaluable when it is needed. I felt, however, that we should never overlook our major medical coverage. Perhaps I was influenced by the fact that I had just been over a current case with Bill Waldon.

One of our young men, 23 years of age, who had been with us about a year was driving from the Middle West after a visit to his mother and disabled father. En route he was very badly hurt in an automobile accident. For the past year Bill Waldon has been in constant contact with the mother and has paid out approximately $8000 in medical coverage. We all hope that, thanks to the medical care and therapy which this young man is receiving, he will be completely recovered soon. Certainly, without it his chances would have been seriously impaired.

His mother writes, "I am so grateful for all the insurance has done for him. He has come a long way but he still has a long way to go yet . . . I want to thank you, Mr. Waldon, and Northrop Corporation for all your kindness." It is in these catastrophy cases that we really learn how fortunate we are that we have our group insurance to help us in real need.

In the next article—our Retirement Plans and some contemplated changes.

F-5 SUMMARY SHOWS 700 JETS NOW ON ORDER

Compiled for the benefit of Northrop employees, here is a summary of the F-5 program, which remains on schedule during completion of the Skoshi Tiger project:

Approximately 700 Northrop F-5 supersonic tactical jet fighters have been ordered or programmed for the modernization of nine allied air forces throughout the world.

The U.S. Department of Defense selected the F-5 in 1962 to replace obsolescent jet aircraft in certain allied countries under the Mutual Security Program. Flyaway cost of the F-5 is approximately $700,000 each for the Mutual Security or Military Assistance model. A supersonic trainer version of the F-5, the Northrop T-38A Talon, is in wide service with the USAF and also NASA.

Canada announced in July 1965 that it had selected an advanced version of the F-5 to equip its new Global Mobile Command. Production of the CF-5 is to begin in Montreal in early 1966.

Norway and Spain have purchased F-5s with deliveries scheduled in 1966 and 1967, respectively.

Iran received its first F-5 squadron in February 1965 and achieved combat ready status in July 1965.

The Republic of Korea's first F-5 squadron was delivered in April 1965 and declared combat ready in September 1965.

Greece received its first squadron of F-5s in July 1965.

The Republic of the Philippines and The Republic of China (Formosa) are scheduled to receive first F-5 deliveries in late 1965. Turkey is also programmed to receive F-5s at year's end.

Entry Blanks Ready For Bowling Event

Dates have been set for the twelfth annual NRC Christmas bowling tournament, with selection of a tournament house pending at NORTHROP NEWS press time.

Squad times will be at 10 a.m., 12:30 and 3 p.m. on both Saturday, December 11, and Sunday, December 12. Entry forms are now available through NRC outlets at Norair and Nortronics.

FRAMED—Photographer Bill Cox just happened to have a spare picture frame in his gadget bag when he went to shoot picture of Alice Bassett for the NEWS. He set it up on the table among keepsakes of Alice's years in show business and had her sit behind it.

VAUDEVILLE: Home on the Range Is New Top Tune With Alice Bassett

(Continued from page 1)

"I remember rehearsing for the tableaus at the Egyptian Theatre every morning, doing four or five shows for Publix at the Los Angeles Paramount downtown afternoons and evenings, and working a nightclub floor show at the Pom Pom when I wasn't doing that.

"One morning I was so tired I literally couldn't sing my part in the Hallelujah Chorus. One of the girls in the choral group said, 'You just stand beside me and open your mouth. I'll sing loud enough for both of us'."

Sid Grauman and Norma Talmadge frequently showed up to select songs for the tableaus, and it was a toss up whether they'd be there and notice Miss Bassett's total lack of volume. But the pantomine worked for that one rehearsal.

The stories of sound motion pictures' conquest of the big circuits are legion, and everyone knows how the movies won out. So Miss Bassett continued her theatrical career in nightclubs and restaurants across the country.

Throughout her career, any time she stayed in one city long enough she resumed her classical voice and dancing lessons.

Some time later, in 1940 to be exact, she came back to Los Angeles and joined up with Ted again. This time it wasn't show business for the "Alice Bassett and Ted Norris" act. Ted had opened up a plant nursery in Hawthorne and Miss Bassett managed it for him.

"I guess that's where I got my thumb painted a little green," she said.

Her thumb is still slightly moss colored, since she and Ted are equal partners in a lilac ranch on Red Mountain, 16 miles southeast of Hemet, California. She bought the ranch in 1962 and brought Ted into the business. They plan to name the 7½ acres Red Mountain Lilac Ranch.

The blooms each year are not only the typical light purple or lilac shade. They range from light blue, purple, and white through red, and some plants produce double blossoms.

The hybrids that develop this vivid assortment of color do not all bloom in April as you might expect from everyday lilac bushes. From March 15 all the way through June, the ranch is flamboyant with lilacs as groups of the 1500 bushes produce their flowers.

So perhaps next year or the year after Alice Bassett will retire to her little 7½-acre ranch on the hillside near Hemet, making this story resemble a plot for a play . . . or maybe a script for the movies, one part of show business that our heroine never took an active part in.

OPERATING COSTS

Salaried workers, executives and corporations prefer giving to worthwhile charities through AID because they know that more of their charitable dollar will reach the causes for which it is intended, due to AID's low cost of operation, about 4 percent of all funds contributed.

NRC ROUNDUP

Engbarth, Craig Win Ash Dunning Tourney

Lou Engbarth of the Northrop AFPR office and Mike Craig of Western Contract Management Region of Los Angeles teamed for a low net of 64 to win the third annual Ash Dunning Memorial Golf Tournament held October 24 at San Clemente.

Seventy-two Northrop par chasers took part in this partner's low ball event.

Bob Marsh and Dave Krieghoff of Nortronics took the top spot in the first flight with a net 65.63. Elmer Noonan and Bill Robusch of Nortronics deadlocked with Glen Brannum and Dave Carney (with 67.38 nets) for second. Warren Lindsey and Dick Johnson of Norair took third.

In the second flight Nortronics golfers swept the first three spots. Dan Casson and Ted Fujimoto won first with a net 67.25; Russ Munsen and Chuck Chamberlain finished second with a 68.88; and Bill Mahlman and Ed Kong took third with 69.88.

Norair's E. Ross and R. Flynn tied for first in the third flight with D. Caughlin and J. Mounts of Nortronics with 65.76s. Norm Henry and Jack Esser of Nortronics took second with a net 66.13, while Bob Sadil and Dave Jenkins finished third with 66.88.

Dick Teel, NRC commissioner at Nortronics Hawthorne, attributed a major part of the success of this event to the work of Tourney Captain Bob Marsh and Norm Henry, handicapper.

* * *

Steak Fry Planned By Camping Club

Plans for a big steak fry in conjunction with a Camping Club outing November 6 at Nojoqui Falls have been announced by NRC Commissioners Earl Bird (Nortronics) and Fred Armstrong (Norair).

The Club will supply steaks, potatoes, salad, bread and refreshments at $1.25 per person. Families are being asked to supply an apple pie for dessert.

Reservations may be made through the following Northrop telephone extensions: Ext. 2486 at Norair; ext. 263 at Nortronics Hawthorne; ext. 441 at Nortronics Palos Verdes; and ext. 1092 at Nortronics Anaheim.

* * *

NRC Golfers Select Long Beach Course

Northrop Golf Club members, from both Nortronics and Norair, will tackle the El Dorado Golf Course at Long Beach November 13 in a regular monthly tournament.

Starting times for 60 players have been reserved beginning at 9:08 a.m. Green fees and prize fund charges total $3.50.

Dick Teel, NRC commissioner of the sponsoring Nortronics Hawthorne group, advises reservations close Friday, November 5.

Christmas Gifts To Go on Display

Gifts 'n Gadgets for Christmas giving will be on display at 7:30 p.m. November 8 at the NRC Clubhouse, 1834 W. Valencia Drive, Fullerton, when the NRC Women's Club meets.

Further, orders will be taken for displayed items with delivery and billing later. A wide assortment will be available for selection including toys, jewelry, novelties, kitchen and housewares, etc. Everything shown will be priced under $5.

Tickets, covering the cost of refreshments, are now available at Anaheim at select locations, President Elaine Steiner reports. They sell for 35 cents each.

* * *

Anaheim Rockhounds Plan 2 Field Trips

November will be a busy month for members of the Nortronics Anaheim NRC Gem and Mineral Club, Commissioner Bob Cornelius reports.

Last night plans were completed for two upcoming field trips at a regular meeting.

The first is a November 20 visit to the Himalayan Mines, where the principal find will be tourmaline. Also taking part in this trip will be NRC rockhounds from the Hawthorne Club.

Over the long Thanksgiving holiday period, individual club members have been invited to join their Hawthorne counterparts in a field trip to the Ogilvie-Wiley Wells area. The Hawthorne group reports a new "find" in the area of petrified wood.

FIRST TEST IN FEBRUARY

Northrop Again Sponsors NMSC Scholarships

Northrop Corporation will again sponsor college scholarships for the sons and daughters of employees through its participation in the National Merit Scholarship Corporation program.

Details involving Northrop's continued support of this important program were presented this week by Richard E. Horner, Northrop senior vice president and chairman of the Northrop University Relations Advisory board which administers Northrop participation.

Northrop scholars, selected from eligible sons and daughters, are ultimately chosen by the NMSC on the basis of scholastic aptitude, leadership, and good citizenship as determined by testing and other procedures established by NMSC.

The amount of each scholarship is based upon the individual winner's financial needs in order to attend the college of his or her choice. Unrestricted grants to colleges and universities attended by the winners is also a part of the over-all NMSC program.

All children, natural or legally adopted, of regular employees as well as the children of retired or deceased employees are eligible. All parts of the Corporation, including its offices, divisions, departments, laboratories, and wholly owned subsidiaries, are included in the program.

Eligible students must take the NMSC Qualifying Test when they are second semester juniors. This test is made available by NMSC to high school principals throughout the United States.

Candidates should make test arrangements with their own school principals during the fall semester of their junior year. The next NMSC Qualifying Test is scheduled to be given on February 26 or March 1, 1966.

This test does not require special study or preparation and is based primarily upon an understanding of, and the ability to use, what is learned, rather than on sheer knowledge of facts.

Semi-finalists are selected and asked to take another examination.

High scoring candidates will be told in January or February of the senior year that they have become finalists as a result of their test performance. They will be required to supply additional information.

Professional evaluation by an impartial committee of educators will determine winners. In most cases, winners will be notified of their awards by April 1 of their senior year.

Each scholarship is a four-year award, called a stipend. It will be based on the family financial circumstances and the cost of attending the college selected. Northrop scholarships will vary between $250 (minimum amount in cases when no financial help is necessary) to the upper limit of $1500 each year.

Each candidate is completely responsible for making arrangements with the accredited college or university of his choice, and for fulfilling its entrance requirements.

Lee R. Thornton, Northrop Space Laboratories, ext. 754, is executive secretary of the Northrop University Relations Advisory board.

NRC Offers Firearm Training for Youths

Northrop Recreation Club has again made arrangements to offer a "Hunter's Safety Training" course in firearms for Northrop sons and daughters between the ages of 12 and 18.

Those under 18 years of age must present evidence of completing such a course to receive a California hunting license.

The NRC-sponsored program opens Friday and will continue November 12, 19 and 24, meeting at the NRC Clubhouse, Hawthorne, between 7 and 9 p.m.

Advanced registration is requested and parents may signup for their youngsters at Norair's Personnel Activities office.

Fred Griffin, a veteran instructor, will teach the course in the proper and safe use of all types of firearms, according to Bob Bagby, NRC Trap and Skeet Club commissioner.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California Vol. 23, No. 20 November 17, 1965

Benedict New President of Anaheim NRC

Bob Benedict, president, heads a new slate of officers elected this month by Northrop Recreation Club at Nortronics Anaheim.

Others elected include Ed Mosher, vice president; Elaine Steiner, secretary; Jack Flannagan, treasurer; and Chet Guzinski, sergeant-at-arms.

This group, plus Bill Kieffer, past president, will also make up the NRC Executive Committee within the 24-member NRC Council which includes 20 commissioners of activities and four representatives-at-large.

A similar election was held over the past weekend by the Nortronics Hawthorne and Palos Verdes NRC.

A joint installation dinner for both Nortronics-sponsored NRC Councils will be held during January with both new slates of officers scheduled to assume office in February.

Mr. Benedict is a long-time member of the NRC Council and guides the popular golfing activity. Ed Mosher is commissioner of the equally-active Art Club. Elaine Steiner is commissioner of the Women's Club. Jack Flannagan serves as commissioner of table tennis, while Chet Guzinski directs Anaheim bowling activities as commissioner.

Election of the new officers came at a regular monthly business meeting held at the NRC Clubhouse November 6.

The term of office for the new leaders will run from February 1, 1966, through January of 1967.

Basketball Teams Can Still Join Up

Reservations are still being accepted from shop groups interested in taking part in NRC-sponsored plant basketball activities this fall.

Team application forms are available through Personnel Activities offices.

READY FOR DELIVERY—Northrop representatives and their guests attending open house and delivery ceremonies for ALOTS (in background) last week included (from left) Major General Horace Hanes, commander of Ninth Aerospace Defense Division, Air Defense Command; Jack Gantz, Nortronics project engineer; Don C. Chalifour, Pan American ALOTS project monitor; and Captain A. J. Guillory, ALOTS project officer, Air Force Eastern Test Range.

SERVICE AWARDS PRESENTED TO 21 ON WEST COAST

Twenty-one Northrop Nortronics employees in West Coast organizations passed service milestones during October, earning Northrop service emblems.

Those receiving 15-year emblems included Jim Baldwin, Ralph Marshall, Christopher Moyer and Tony Santaella of Nortronics Hawthorne; Zigmund W. Detz, Stephen Finnegan and Thomas E. Kelecy of Anaheim; and Rene Joubert of Palos Verdes.

Ten-year emblems went to the following: from Anaheim, Jeanne Cohick, Mary Diel, Anthony Michalla, Gaylord E. Miller, Charles T. Meyers, jr., and Robert L. Smith; from Hawthorne, Bill Fryer, Anthony Musuraca, Howard Roberts jr., and Aaron Vance; and from Palos Verdes, Leslie Green, Hubert Turney jr., and Harry Tokashiki.

Craftsmen at Anaheim Win Another ZD Award

Northrop Nortronics craftsmen have again received an award for their defect-free work on Mark 7 missile test and readiness equipment (MTRE). A delivery this month marks the fourth straight defect-free completion of an MTRE unit, used to test readiness of Polaris missiles.

The degree of perfection which Nortronics production personnel have attained in automatic test equipment is further enhanced by the fact that there are 41,919 components and 214,347 electrical connections in each Mark 7 unit.

Ray Schultz, director of Manufacturing at Anaheim, credited the achievement to a cooperative effort by the U.S. Navy, Nortronics and Lockheed's Missile Systems Division, prime contractor for the Polaris weapons system.

Employee motivation to stamp out errors came from the nature of the program itself, Mr. Schultz said.

"We merely told our people that this program was critical to our nation's defense, and it was our obligation to do it right the first time. Quality craftsmanship is the way of life here, as it was even before the Zero Defects program was established.

"As you know, we received the first contract for Polaris test equipment eight years ago and delivered hardware in six months. Since that time we have had a continuing program to improve manufacturing techniques and craftsmanship through two successive generations of hardware.

"Our field service engineers also have helped a great deal in meeting our goals through their first hand reports of our equipment's operational performance. Today our equipment has a 99.4 percent reliability record aboard class 616 and 627 nuclear submarines."

The craftsmanship award came this month from Lockheed, which made a similar award last March. Lockheed presented a certificate "to recognize craftsmanship that produces sustained delivery of defect free components of a critical nature . . . in support of our nations' advanced aerospace position."

NEWS Adopts Revised Publication Schedule

In order to afford maximum coverage of the many traditional yearend activities throughout Northrop, a revision in NORTHROP NEWS publication dates for the remainder of 1965 has been adopted.

NEWS editions will be distributed December 8 and December 22. Deadline for copy and classified advertisements will be November 24 and December 13 respectively.

Flight Tests Under Way For ALOTS

A team of seven Nortronics engineers has accompanied the first ALOTS to the Air Force Eastern Test Range for its final acceptance tests following delivery ceremonies at Ontario Airport.

ALOTS, or Airborne Lightweight Optical Tracking System, was flown to Patrick Air Force Base installed on the Lockheed KC-135 from which it will operate during missile launches.

Headed by Jack Gantz, the Range Instrumentation unit members who accompanied ALOTS were Jaime Oaxaca, Lovere Moesser, Don Eakin, Vergle Case, Bob Meffan and Mario Artavia.

In a preliminary display of the system at Ontario Airport, California, last Wednesday some 100 military and industrial officials learned details of its operation.

In attendance was USAF Major General Horace Hanes, commander of the Ninth Aerospace Defense Division, Air Defense Command. He was escorted by Colonel Arthur Bridge, commanding officer of the 153d Fighter Group, California Air National Guard, Ontario.

Representatives of the Western Test Range, Space Systems Division, Ballistic Systems Division, and Strategic Air Command, from headquarters in Omaha, Nebraska, also inspected the initial airborne optical tracking system.

Air Force project officer for ALOTS, Captain A. J. Guillory, flew to Ontario from the Eastern Test Range.

Designed to track missiles from high flying aircraft, the airborne tracking system was delivered to the Air Force at Patrick within the last few days. All requirements except actual performance

(See ALOTS, page 6)

Analysis of Data From Orbiting Payload Begins

The Flight Experiment Shielding (FESS) payload, developed and manufactured by Northrop Space Laboratories to investigate radiation hazards in space, is operating satisfactorily and the arduous task of analyzing data from the orbiting instrument package has begun at NSL.

Contained in an orbiting vehicle, designated OV1-2, the Northrop-built FESS payload was launched into the inner Van Allen belt October 5 from Vandenberg Air Force Base.

The satellite is orbiting at an inclination of 144 degrees, with perigee of 225 nautical miles and apogee of 1878 nautical miles. During its projected six months lifetime, FESS will return more than 100 million pieces of data to earth for analysis.

Analysis of this data is being performed by the Nuclear Sciences Laboratory under a separate contract with the Air Force Weapons Laboratory at Kirtland Air Force Base, New Mexico.

NO MYSTERY TO RUSS

Look, Touch, Listen, Says Pearl Expert

Two of milady's five basic senses — sight and touch, can help her distinguish between real pearls and imitations.

Russ Black suggests this method:

"Rub the objects across an unpolished fingernail or, better yet, a natural tooth. A pearl will create friction and causes a grating sensation. Quality pearls reflect a warmth and luster easily visible to the eye and impossible to imitate."

While Russ finds these simple tests generally adequate in identifying pearls, he cautions only an expert can determine their value. And pearl experts are rare.

This intrigues Russ for the pearl, nature's fascinating by-product, is the most common, and copied, of all precious stones. Yet despite its opulence, the pearl remains something of a mystery to the average person, wrapped in misconceptions, seldom understood and less familiar than other gems.

Russ Black is a Northrop Nortronics buyer in Purchasing at the Hawthorne facility who has spent almost 20 years in part-time study of the pearl.

As a young soldier Russ was sent to Japan in 1946 and became interested in pearls. He elected to be discharged there and for almost 10 years worked in civil service, as a junior partner in a business firm, and as manager of his own business there. He made many Japanese friends, learned their customs and language, coached their youth in athletics, and even married one of their fairest daughters. Some of those friends were engaged in the budding pearl business and took him behind the scenes.

Russ visited farms where mother-of-pearl oysters were grown. He called on other farms where bits of shell (found only in the Mississippi River region) were implanted in oysters. He saw these oysters, 500 at a time, suspended below the water. He observed how they had to be removed each six months to scrape off parasites during the three to five years required to produce pearls. He found storms frequently broke these containers from their moorings, spilling their contents and was told of the oyster's never-ending attempt to eject the shell particles. He spent long hours in processing plants where pearls were removed, cleaned, sorted and prepared for market.

(See PEARLS, page 6)

DOING THE CONTINENTAL

On October 20 some 140 Northrop employees and family members boarded this waiting Air France jet to take part in the annual NRC-sponsored European excursion. They returned November 7. Between those dates 63 took part in a tour of Southern Europe, 10 traveled to Spain and Portugal, and the remainder spread out to visit their favorite European spots on their own. Next NRC-sponsored tour is a Hawaiian visit during the long yearend holiday.

OVER THREE COUNTIES

Five J-A Firms Get Division Support

Northrop Corporation, a participant in Junior Achievement activities continuously since they were introduced in Southern California 12 years ago, is once again supporting this important youth activity.

This year, as in the years just passed, Northrop's interest spans three counties—Los Angeles, Orange and Ventura. It includes five Junior Achievement companies in which more than 100 teenagers are active.

Junior Achievement is a nationwide businessmen's program of economic experience in which teenagers learn about the American system of private enterprise by operating their own small-scale corporations. Youngsters form their companies, elect officers, select and manufacture a product, then market that product. Operating funds are procured through the sale of stock which is redeemed at the end of the year.

Industries, like Northrop, may support this program by two major means. One is to become a sponsor, a donor of funds to support the over-all program. The other is to provide counselors who actually work week-to-week with the youngsters.

Northrop is both a sponsor and counselor.

Counselors selected for this program are Northrop men who volunteer their time and effort, often working long hours to make the program a success. They are, in all respects, the true "backbone" of Junior Achievement.

Each of Northrop's three major divisions in Southern California are active in Junior Achievement. Northrop Norair and Northrop Nortronics each sponsor and provide counselors for two companies, while Northrop Ventura provides the same services for one company—the only firm thus far established in Ventura County.

The two Norair-sponsored firms, plus one sponsored by Nortronics Hawthorne, meet at the Southwest Junior Achievement Center in Hawthorne. The others meet in their respective counties.

Norair-sponsored firms this year are called Minico and Verse Kraft. Minico will produce and market a Christmas candle table decoration. Its officers, elected by the teenagers, are Terry Gilbert, president, Gayle Johnson, secretary, and Shirley Harshaw, treasurer. Counselors or advisers are John Patrick, management, Hal Maninger, sales, and Jim Crase, production. Verse Kraft officers are Michael Di Donato, president, Paula Combs, secretary, and Rozellen Bancroft, treasurer. Ad-

(See ACHIEVEMENT, page 5)

Reservations Scarce For Hawaiian Tour

Only a few reservations remain on the NRC-sponsored Christmas tour of the Hawaiian Islands. Final arrangements will be made for their tour at 7:30 p.m. December 3 in a meeting at NRC Clubhouse, Hawthorne.

At that time some lucky traveler, from among those who have booked space on the tour, will be selected for a free trip.

Departing December 24 and returning January 2, the tour will include visits to four islands, many sightseeing trips, etc. The cost is $378 per person and includes jet air travel, transportation, lodgings, some meals and side trips. Contact Personnel Activities offices for information.

Two Days Remain For Tour Tickets

Only two days remain in which to procure tickets for the all-Northrop day scheduled Saturday at Universal Studios.

Tickets will be available through normal Northrop ticket outlets through Friday. No tickets will be available at the gates.

This famed motion picture and TV production center with its many attractions will be reserved exclusively for Northrop families Saturday. Gates open at 9 a.m. and close at 6 p.m. Snack facilities and the studio's commissary will be open for those who care to dine inside the studio.

Features include a motorized tour aboard "Glamor-Trams" to see sets, scenery, sound stages, dressing rooms, etc. There is also a behind-the-scene tour to see how special effects are created for films. The last "Glamor-Tram" departs at 3:40 p.m.

Because of the joint sponsorship of Northrop Recreation Clubs, tickets will cost employees less. Adults will be admitted for only $2, while children seven through 11 years pay $1.25. Children under seven will be admitted free when accompanied by an adult.

LES BROWN TO PROVIDE MUSIC FOR ANNUAL CHRISTMAS DANCE

The International Ballroom of the International Hotel will be the setting December 11 for Northrop's big social event of the year—the annual Christmas holiday dance.

Northrop Recreation Clubs are combining their efforts to present this gala affair from 9 p.m. to 1:30 a.m.

Les Brown and his "Band of Renown" will provide the music with a special Latin orchestra performing during intermissions for those who cater to a more bouncy beat.

Les Brown

The cost per person is a modest $2.10, thanks to NRC sponsorship. Tickets are now available at all normal ticket outlets throughout Northrop facilities in the area.

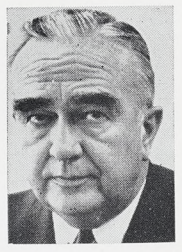
Special arrangements are also being made for parking. With validated parking tickets, the price is only 50 cents per car for self-parking and $1 for valet service.

The huge International Ballroom, seating 1350 in comfort and luxury, will be reserved for Northrop personnel and their guests. However, tickets are being offered on a first-come, first-served basis.

Dinner will not be served in the International Ballroom, but Northrop people may make special arrangements for dinner in either the Hunt Room or Penthouse by calling 670-9000 for reservations.

FRINGE BENEFITS

A New Look At Retirement



By WILLIAM LARRABEE
Vice President—Industrial Relations

In recent years the company-sponsored retirement plan has become a way of life for the American worker. Back in 1952 Northrop established plans for both its salaried and hourly-paid people which provided, in substance, that a retiring employee under the plans got a fixed number of dollars for life based on the amount of his compensation and his length of service. The company paid the entire cost. The plans had other features, of course, and were fine for their day. As time went on, however, it became apparent that changes could be made which would be to the advantage of all of our people.

A problem then common to almost all plans was that they provided for a fixed number of pension dollars without taking into account the fact that as the cost of living changed, the dollar payments would not buy the same amount of food and housing as they bought when the person retired.

Your interdivisional Industrial Relations committee investigated every possible solution to this situation. It developed in the course of these studies that pension authorities across the country had been working on a "variable annuity" principle which seemed to offer a way out of the dilemma.

"Variable annuity" sounds pretty complex, and indeed it is in some of its details. The basic theory, however, is not complicated at all. It was proven statistically over the years that the prices of equity securities, for the most part common stocks, rose and fell at roughly the same time and rate as the cost of living. It followed that if pension funds were invested in equity securities and the retiree's pension went up and down with the value of those securities, the pension would maintain a much closer relationship to the cost of living.

Your committee concluded that we should go to the variable annuity principle but that we should not put all of our pension eggs in one basket by investing everything in common stock. It recommended to management, therefore, that part of the retirement income still remain in fixed dollars which, when tied in with Social Security, would give a specified dollar income to the retiree. It recommended that the remainder of the pension funds be invested in equity securities so that the retiree would have some hedge against cost of living changes.

As a result, our plans were so amended in 1957, which put Northrop in the forefront of our industry in this regard. As it turned out, it is fortunate indeed that our management stepped in and recognized this problem when it did. We all know what has happened to the cost of living since 1957.

Many of us have retired friends who are tied absolutely to fixed pensions and who have seen the real value of their retirement pay dwindle in terms of what they can buy. Thanks to the foresight of our people, our men and women retiring after the effective date of this change have had a degree of protection which others lacked over these intervening years.

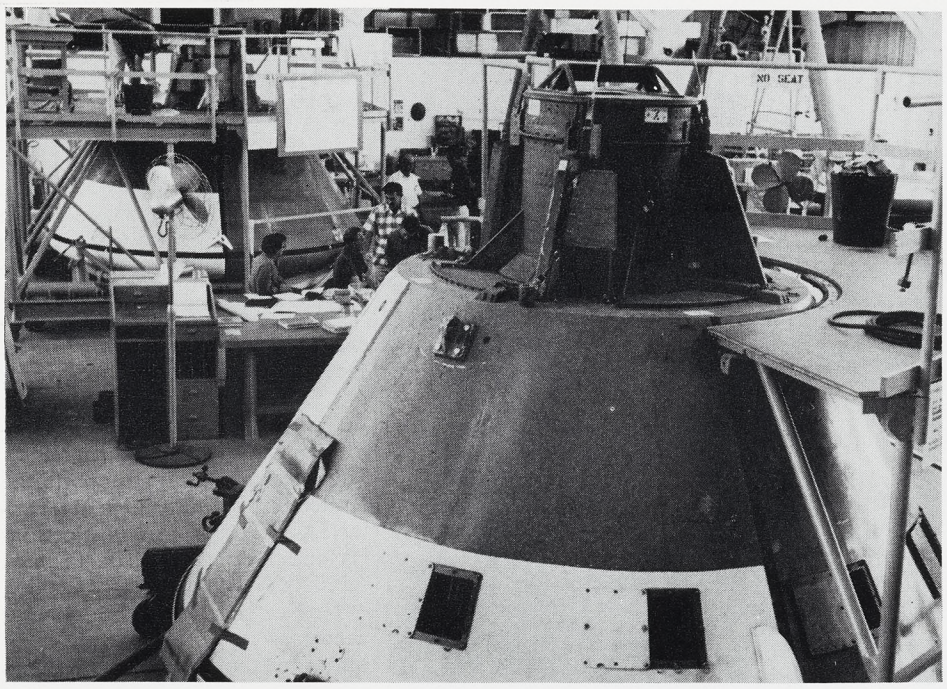
Since 1957 our plans have been amended several times to make them better and more workable. Recently, however, trends have been developing which indicate that we should take a strong look at some further important changes.

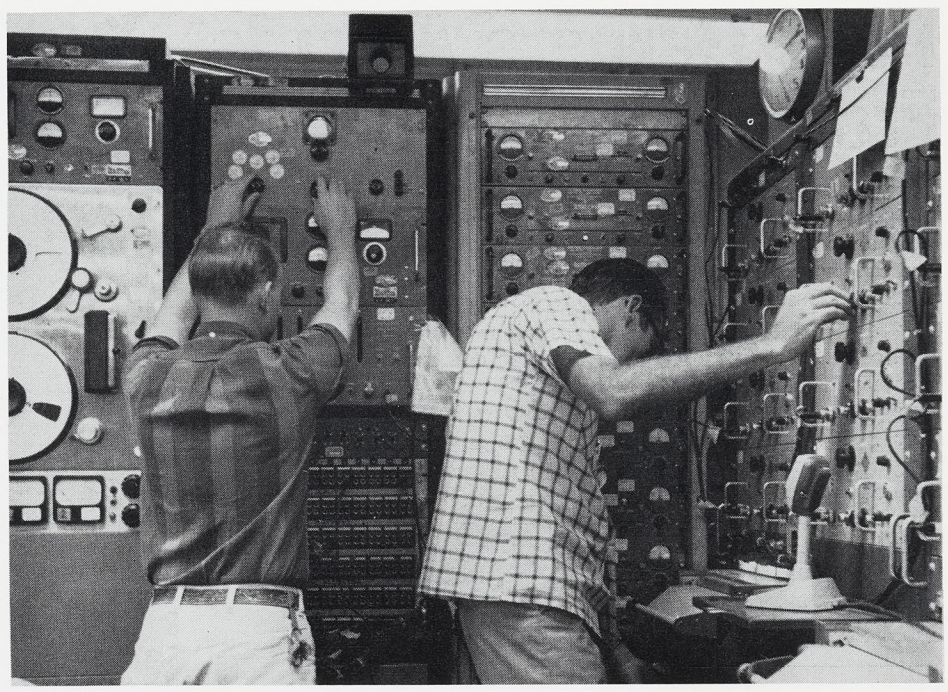
For instance, inflation has pushed salaries and wages up, and yet many people retiring in the future will find their pensions under industry plans based in part on the rates of pay they had many years ago. Furthermore, early retirement is permitted under most plans, including ours, but the financial penalties for retiring early have been so stiff that few people take advantage of this right. Additionally, the Government has raised the rate and the wage base for Social Security taxes very substantially, due in large part to the Medicare bill.

This year the company and we, as employees, are each paying 3.625% on the first $4800 of our earnings ($174). In 1966 we and the company each will be paying 4.2% on the first $6600 of our earnings ($277.20). The increase in the base from $4800 to $6600 would actually reduce our future retirees' pensions unless we take action, since our pensions are figured, in part, upon a percentage

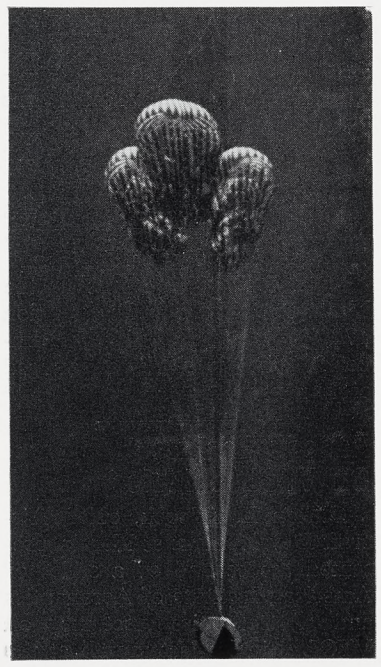
(See FRINGE BENEFITS, page 5)

INDUSTRIAL RELATIONS COMMITTEE—Northrop's four Industrial Relations directors are responsible for working out details of fringe benefits, including retirement. From left, Paul Crews, committee chairman, is Norair director; Frank Smith is Corporate director; Rex Fairless is at Northrop Ventura and Elmer Noonan is at Northrop Nortronics.

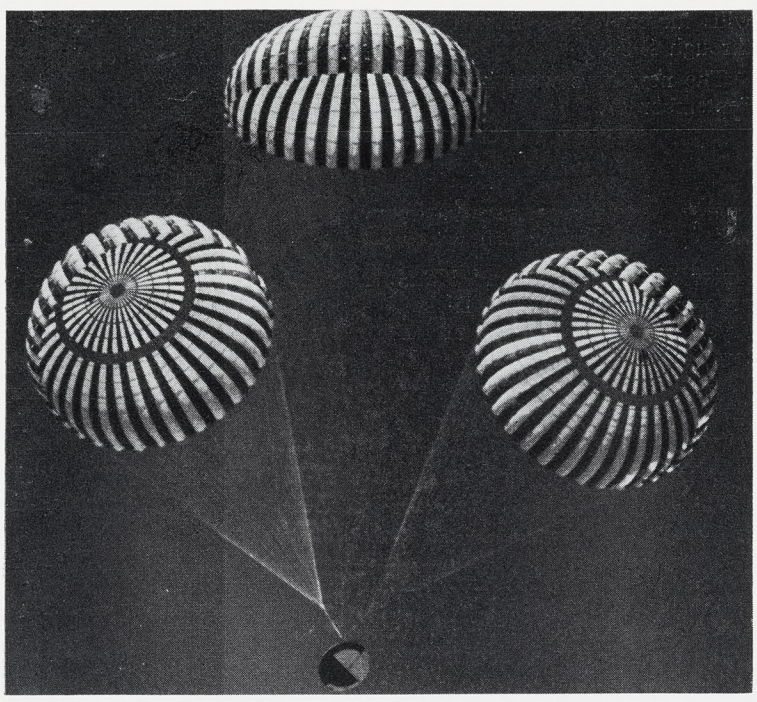




THE BIG PICTURE—Hangar 225 (left photo) at El Centro test facility is a center of activity in preparing for drop test. Among functions performed here is boiler plate refurbishment, ELS equipment installations, airborne systems checkout. Also in hangar is telemetry ground station (right), where Clay Robinson and Wal Masters are preparing for test. Station provides "quicklook" data of test parameters during drops.



Chutes deployed (above), it remains only for pyrotechnic cutters to actuate, permitting full opening of main chutes (below).



EL CENTRO, USA

Hot Barren Land of the Drop Test

By ROBERT STEINGART
Northrop News Staff Writer

A parachute landing system test area requires almost limitless flat, uncluttered territory and good flying weather throughout the year. Where these requirements are concerned the Naval Air Facility (NAF), El Centro, stands unopposed.

Mile on mile of seared earth, sand and ground hugging brush stretch toward the mountainous horizon, with no sign of human habitation. Official temperatures in summer hover at the 120 degree mark. Humidity is practically nonexistent.

Even at summer's end 95 degrees in the shade registers on thermometers — and the desert brush offers no shade.

This parachute test facility lies on the rim of the parched Arizona Desert, near the city of El Centro, California. The Chocolate Mountains and the Superstitions brood at its flat edges, perhaps still hiding the whitened bones of prospectors from an earlier period.

But the heat and isolation make little impression on a team of Northrop Ventura specialists working within the confines of the facility. To them NAF is just another test station where they can carry out their role, producing earth landing systems for the U.S. space program with a minimum of outside interruption.

During World War II the desert drop area was utilized as a Tactical Air Training Unit (TATU) drone-flying zone. It sits on the edge of the El Centro Naval Air Facility. Functionally part of NAF, it passively accepts the impact of Apollo parachute test vehicles and boilerplate capsules.

Before Apollo, a multitude of parachute-suspended test items were dropped at TATU in hundreds of tests, usually to be redeemed and dropped again.

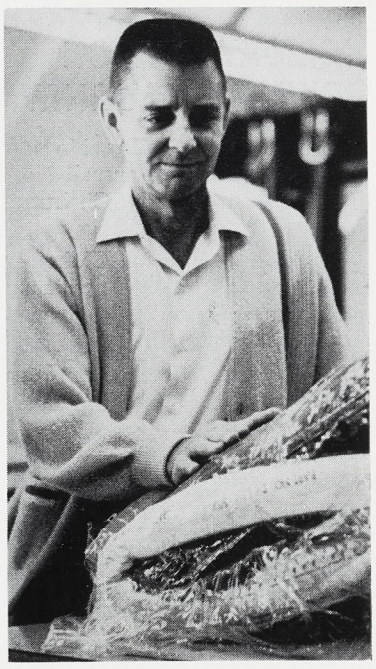
There have been Ventura people at NAF, El Centro, intermittently since 1948.

Mercury's parachute system utilized NAF to the fullest, and in 1962 Gemini program drops began, to run almost continuously until early this year. Two of the Gemini tests moved the Northrop staff northward to the Salton Sea for simulated ocean landings.

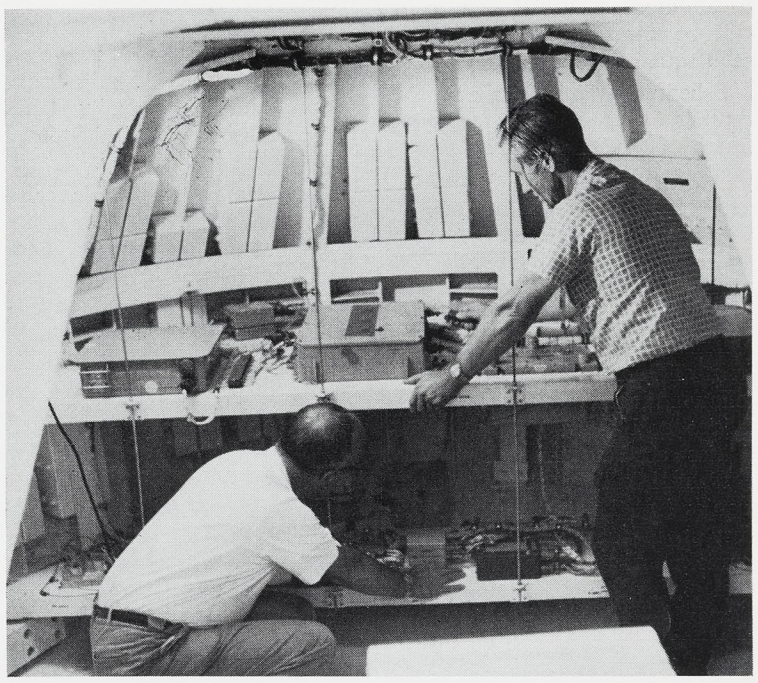
While Gemini was still on board, in 1962, the first series of Apollo tests began and the programs ran simultaneously until February 1965.

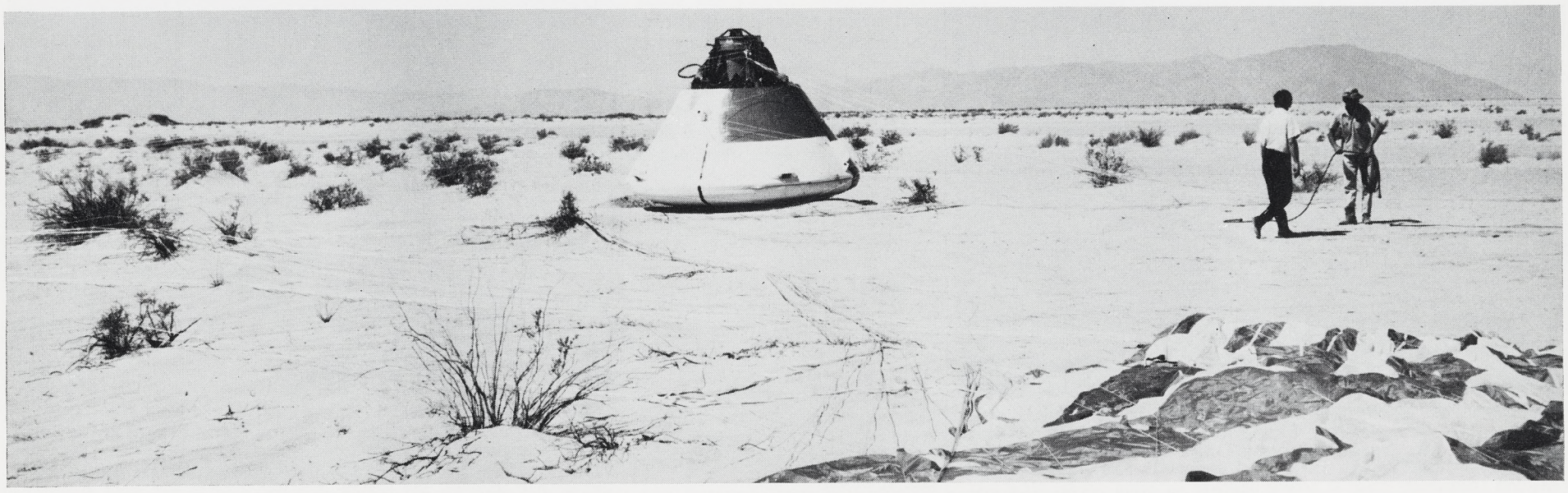
In April 1963 Apollo drop tests came hot and heavy, and a permanent installation was established. The El Centro Field Test branch took over an administration building and converted a warehouse into a parachute loft. A hangar already sheltered work on the boilerplates and PTVs.

The Block I Apollo qualification drop series began in May 1965, with completion in February 1966 anticipated.



Con Harley (above) is base administrator. Looking into interior of Apollo boilerplate (below), George Reardon and Otto Goerish install electrical equipment for drop test.





AND, FINALLY, THE BOILERPLATE TEST VEHICLE COMES TO REST IN A SEA OF SAND.

Page Garners Awards From Comsat, Army

Agreement on two contracts totaling more than $10 million have been announced by Page Communications Engineers, Northrop subsidiary based in Washington, D.C.

The U.S. Army Electronics Command, Ft. Monmouth, New Jersey, has awarded Northrop Page a $5.7 million contract to design, engineer and install an integrated wideband communications system (IWCS) in South Vietnam. The U.S. Army Strategic Communications Command has operational responsibility for the system, Page President Joseph A. Waldschmitt said.

Earlier, the Communications Satellite Corporation announced agreement with Page on a contract for three transportable earth stations to be used as links in providing communication services for Project Apollo. Total cost of the contract is $4,512,772.

Comsat filed the contract for the stations with the Federal Communications Commission in conformity with FCC rules requiring 10 days notice for such awards.

The three transportable stations are designed to be used as part of a proposed system of satellites, and other ground facilities, capable of supporting NASA's requirements of routing Apollo program communications into the space agency's control center in Houston, Texas, no later than September 30 of next year.

Filings by Comsat are pending before the FCC to purchase four satellites from Hughes Aircraft Company for the space portion of the system. The spacecraft would be capable of providing other commercial satellite communications in the Atlantic and Pacific.

The three transportable stations with 42-foot Casshorn antennas would be located at Andover, Maine, Brewster Flat, Washington and Paumalu, Oahu, Hawaii.

In announcing the IWCS program, Mr. Waldschmitt said target date for completion is early 1966. A Page survey team—supported by a full-time Page staff headquartered in Saigon—has been sent to the area to establish site locations and determine specific design requirements.

IWCS will comprise tropospheric scatter, microwave links and technical control facilities capable of simultaneous voice, teletype, data and facsimile transmission at the high quality standards established by the Defense Communications Agency.

A pioneer in worldwide communications systems design, installation and management, Page gained early experience in communications requirements peculiar to the geographical area of South East Asia. For the U.S. Military services in 1962, Page built the ten-terminal Back Porch tropo system and delivered it on schedule, seven months from the date of contract award to completion and turnover to the military.

Page will further expand the Back Porch System under requirements of the new IWCS contract.

NRC TO SPONSOR HOLIDAY SEASON BOWLING TOURNEY

Entries close Monday, November 22, for the 12th annual Northrop Corporation Christmas Bowling Tournament.

Northrop Recreation Clubs are sponsoring this big event which is open to all Northrop employees and their families. It will be held December 11 and 12 at Tropicana Lanes, 11163 Prairie Ave., Inglewood.

Entry blanks are currently available through NRC outlets.

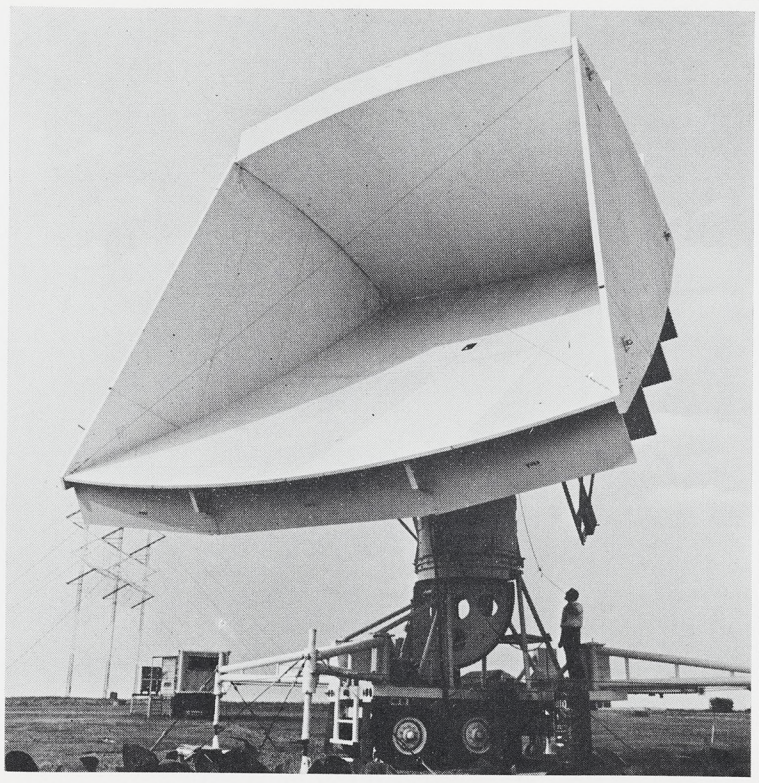
Plans call for "A" and "B" divisions in men's and women's singles and doubles events and in mixed doubles. Entry fee is $2.75 per event.

Trophies will be awarded first-place winners in each division and also for individual high over-all, high scratch series, high scratch game, high handicap game and most pins over entering average. In addition, a special door prize will be awarded at the end of each squad rolling.

Schedules will be available December 6 and will call for squad times of 10 a.m., 12:30 and 3 p.m. each day.

The 1965 tournament committee is made up of Bob Arrasmith and Dorothy Baldwin of Nortronics; Bill Myerson and Vi Jennings of Norair.

Entry forms may be obtained from and submitted at any of the following locations: Personnel Activities at Norair; Personnel Activities at Nortronics Anaheim; Personnel offices at both Nortronics Hawthorne and Palos Verdes; the Northrop Ventura Personnel Services office; and Industrial Relations at Palmdale and Edwards Air Force Base.



APOLLO COMMUNICATIONS—Northrop Page—developed antenna is key to new contract with Communications Satellite Corporation for transportable earth stations to be used as links in providing communication services for Project Apollo. Horn shape is unique characteristic of antennas, which will be located in Maine, Washington, and Hawaii.

EMPLOYEES URGED TO STUDY NEW MOTOR VEHICLE LAWS

Northrop's safety directors at Norair, Nortronics and Ventura divisions have urged employees to become familiar with new motor vehicle laws enacted by the 1965 California Legislature.

Most important among these, according to the directors, are:

—Dimming lights: headlight beams must be lowered when following another vehicle within 300 feet, a change from 200 feet.

—Slow moving vehicles: On a two-lane roadway, a slow vehicle followed by five or more vehicles must pull to the side wherever sufficient area exists for a safe turnout. On a multi-laned roadway, a driver of a car traveling slower than the normal speed may be cited if the car is not in the right-hand lane.

—Pedestrians: Pedestrians are prohibited from suddenly leaving a curb or other place of safety and walking or running into the path of a vehicle which is close enough to be an immediate hazard.

—Litter: The owner of a vehicle, or its driver if the owner is not present, is responsible if he aids or abets the throwing of any litter from the vehicle.

—Registration fees: Basic registration fees beginning in 1966 will increase a dollar a year through 1968.

The new laws went into effect September 17.

Las Vegas Trip Is First Prize In Slogan Contest

A week end for two in Las Vegas is top prize this year in the annual United Crusade slogan contest. All Northrop employees in Southern California are eligible to compete.

Sponsored by the United Crusade Industrial Press Committee, the contest is based on 25 words or less, telling why you support the United Crusade through Northrop in-plant charity programs.

Northrop Ventura supports the United Crusade through its Dollar Donor program and Nortronics and Norair divisions through AID.

No special writing ability is necessary to win, and there is no limit on the number of entries from each participant.

First prize this year is provided by Holmes & Narver, Inc., and consists of round-trip air transportation, hotel accommodations for two nights at the Hacienda Hotel and an expense check for $100.

Thirty other prizes are being offered, including merchandise, cash and U.S. Savings Bonds.

Entries should be sent to the Northrop News, Organization 170, Beverly Hills, before December 3. Winners will be announced early next year.

Adcock Lectures On VTOL Vehicles

Clifton L. Adcock, chief, Aircraft Development at Norair, presented the second of a series of American Institute of Aeronautics and Astronautics lectures on VTOL vehicles last month at the AIAA auditorium, 7660 Beverly Boulevard, Los Angeles.

Mr. Adcock, with 18 years in the aerospace industry, directs Norair V/STOL activities. He offered information on direct lift and vectored turbojet engines as an approach to high subsonic or supersonic VTOL aircraft.

AT ANNUAL DINNER

Northrop Scout Supporters Commended

The continued interest of Northrop Corporation and its leaders in the future of Boy Scout activities was evident last week as the Centinela District held its annual recognition dinner at the Airport Marina Hotel.

Thomas L. McCarthy, Norair manager of Administration, received special commendations and a plaque recognizing his leadership (for 2½ years) as District Chairman.

Richard Iseminger, District Scout executive, lauded Mr. McCarthy for his long service, noting the Centinela District has made great strides under his guidance. He also added a special word of praise for Welko Gasich, Norair vice president and assistant general manager — Technical, whom he described as the "father of Special Interest Explorer Scouting in Los Angeles."

Succeeding Mr. McCarthy as chairman is William Drake, vice president and treasurer of Aerospace Corporation.

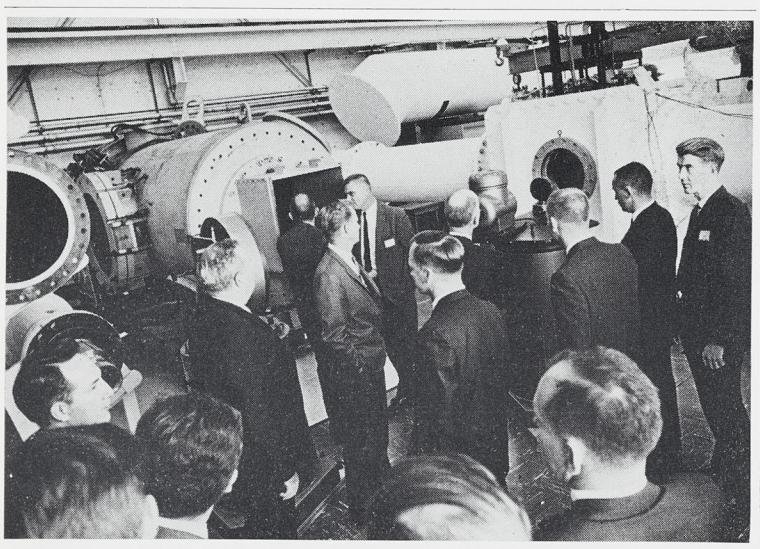
Richard Nolan, Northrop senior vice president, made a special report in his capacity as district nominating committee chairman at the dinner.

Northrop Corporation leaders will continue to serve the scouting world during the coming year, with no less than seven accepting special posts.

Richard E. Horner, Northrop senior vice president and Norair general manager, and Richard Pryor, general supervisor of Personnel Activities, will serve as district representatives to the Los Angeles Area Council.

Named Centinela District members-at-large were Mr. McCarthy, Milton Kuska and Arnold Sorenson (a consultant) at Norair, Elmer Noonan at Northrop Nortronics, and Victor Cherbak of the Corporate office.

The annual recognition dinner was attended by some 500 leaders of all elements of scouting. Highlight of the evening was the presentation of special honors to six volunteer leaders for their contributions to scouting.



SUPERSONIC SETTING—Northrop Norair's hypersonic-supersonic wind tunnel complex, above, was interesting focal point during tour November 1 when participants in 24th Semi-Annual Supersonic Wind Tunnel Association meeting visited Norair. Meeting drew international group with Paul Jensen, chief of Research Laboratories group as general chairman for entire two-day affair held at Airport Marina Hotel. Norair was host for meeting.

LEADERS PLAN SCOUT PROGRAM—Thomas L. McCarthy (right), Norair manager of Administration, recently completed 2½ years as chairman of the Centinela District, Boy Scouts of America, Los Angeles Area Council. He goes over plans for annual recognition dinner with Sidney Handler, left, dinner chairman and new District vice chairman, and Richard Iseminger, District Boy Scout executive. Seven Northrop Corporation men will serve Centinela District during coming year.

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills.

Classified

Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Ring & pinion gear, 3.36 1 ratio for Chevrolet, $25. Torrance, 324-5698. A

Plymouth, 1958, 9-pass. wagon, Suburban, all-power, $550. Hermosa Bch., FR 9-7342. A

Ford Fairlane, 1959 convt., new p/b & p/s, r/h, $275. L.A., PL 4-4052. A

Roller Skates, shoes, ladies size 7, $20. Hawthorne, 675-1057. A

Piano, practice, upright, $110. Brea, 714-529-1436. A

Buick Special, 1956, new battery, shocks & smog device, good tires, $325. Inglewood, 677-8456. A

VW Bumpers, front or rear, complete w/ guard, $24. Huntington Bch., 714-897-8201. A

Chevrolet, 1955, 2-dr., auto. 6, r/h, new paint, $140. Canoga Pk., 348-6037. A

Opportunity to obtain pvt. pilot's license at minimum cost as part owner of late model aircraft, $250. Manhattan Bch., 379-2649. A

Volkswagen sedan, 1965, w/s/w, $1675. Inglewood, 673-1589. A

Camera, Polaroid, $35. Buena Pk., LA 1-4711.

Apt. House, 32 units, deluxe, pool, patios, 6-yrs.-old, $359,000. Hawthorne, OS 9-7909.

Falcon ranch wagon, 1962, new paint, $800. Box 2001. A

Figure Ice Skates, boy's size 6, $10. Torrance, FR 8-1350. A

Corvette Stingray, 1963, 4-spd., positraction, 340 hp, radio, elec. windows, $2995. Hawthorne, 676-3765. A

Bicycle, girl's, Huffy, 26", $10. Anaheim, KE 5-6990. A

VW sunroof, 1963, $1225. Long Bch., 596-1280. A

Crib & mattress, $15. Lawndale, 371-0194. A

MG Midget, 1964, top, tonneau, r/h, wire wheels, $1695. Torrance, 370-2876. A

Chevrolet, 1958, 2-dr. Del Rey h/top, floor stick shift, $350. Redondo Bch., 374-2433.

Home, 4-bdrm., fam. room, 2 bath, all built-ins, fenced yd., 1-yr.-old, 1 mile to Research Park, ocean view, $41,900. P.V. Pen., 377-5172. A

Hockey Skates, boy's, ccm, size 6, $8. Norco, 735-1232. A

Range, Gaffers & Sattler, chrome top, $75. Torrance, DA 4-0161. A

Trailer, 1-wheel, utility, 4x6 box, hitches inc., $50. Hawthorne, OS 6-1454. A

Guitar, Martin 0-18 w/case, $155. Hawthorne, 679-1981. A

House, 4-bdrm., 2-bath, 2½-yrs.-old, $26,500. Torrance, 834-2175. A

Deep Freeze, chest-type, 2-dr., 16 cu. ft., $55. Hawthorne, OS 5-2882. A

Car Radio, for 6-volt car or boat, $10. Hawthorne, 676-0418. A

Chevrolet Impala, 1960, 348, 3-2s, 4-spd., small Ansen steering wheel, $1300. Hawthorne, 675-2514. A

House, 4-bdrm, family rm, sprinklers, professionally landscaped, $36,950. Torrance, 327-2666. A

Triumph Bonneville T 120 TTS, 1964, $875. Torrance, TE 5-8608. A

Pups, beagle, 9-wks.-old, 2 male, 1 female, AKC reg., have shots & papers, $75. Orange, 532-3743. A

Accordion, 120-bass, Bonelli, w/case, $125. Gardena, DA 4-0158. A

Electrical Wiring, 500 ft., 25 light sockets, 1 fuse box, $35. Bellflower, 925-4398. A

Lawnmower, reel-type, Sears, $35. Hollydale, ME 3-2395. A

Camper, 1962, Open Road, overcab, sleeps 4, completely equipped, $795. Hawthorne, 644-3370. A

House, 4-bdrm., family rm., 2½ baths, 1 acre, horses OK, near Northrop Ventura, $35,000. Somis, 805-482-1186. A

Skin diving Outfit, hood, pants & top, size 40-42, 3/16" rubber, $50. complete. Torrance, 323-4257. A

Volkswagen sedan, 1965, sunroof, side mirror, seat belts, radio, 2400 miles, $1925. Long Bch., 633-5938. A

Sewing Machine, Gibbs & Wilcox w/attachments, $85. Box 2002. A

House, 1-bdrm., on R-2 lot, good income property, $9500. Torrance, FA 1-3466. A

Cemetery Plot, dble. interment, 3, Inglewood, $800. Rolling Hills, FR 7-1043. A

Paint Sprayer, 1 qt. w/air compressor, electric oper., $15. Hawthorne, OS 5-6206. A

House, 3-bdrms., family room, laundry, yard, $33,900. Manhattan Bch., FR 9-7775. A

House, 2-bdrm., fireplace, w/w carpeting & drapes, lot 45x145, $21,950. Inglewood, OR 1-3860. A

Playpen, wooden, $12.50. L.A., OR 0-4342. A

Rug, thick English-made oriental style, 12x15 ft., blue & rose, $200. Rolling Hills Ests., FR 8-5175. A

Coffee Table, 52"x22" w/2 step end table set, Danish modern, blonde, $35. Inglewood, 758-8342, 759-7635. A

Stove, O'Keefe & Merritt, gas, chrome top & griddle, storage drwr., $50. Hawthorne, OS 5-2433. A

Falcon, 1960, 2-dr., r/h, 65,000 miles, $399. Santa Monica, EX 3-5983. A

For Sale

House, 2-bdrm., knotty pine living rm., 87'x250' hillside lot, $22,000. Torrance, 375-6634. A

Sunbeam Alpine, 1963, wire wheels, new tires & paint, low mileage, $1300. L.A., MI 5-4163. A

Frequency Meter, VHF-UHF TS 175/U 80-1000 mc, self-contained power supply, $125. El Segundo, 322-6655. A

Plasterer's Scaffold, $50. L.A., OR 1-0574. A

Television, Crosley, mahogany cabinet, 17", continuous tuning, $25. Torrance, FA 8-6839.

Volkswagen, 1964, AM-FM radio, 30,000 mi., $1450. P.V. Ests., 379-5033. A

Plymouth Fury, 2-dr. h/top, 383 cu. in. eng., r/h, p/b, p/s, auto. trans., $1900. Redondo Bch., 374-2915. A

Ford station wagon, 1957 country sedan, r/h, Fordomatic, new tires, T-Bird eng., $225. L.A., PL 6-0015. A

Ford station wagon, 1959, air conditioning, r/h, auto, p/s, p/b, w/s/w, other extras, $595. L.A., 474-3433. A

Home, 4-bdrm., 2-car gar., landscaped, custom interior, insulated walls, $29,950. Hawthorne, 644-1958. A

Cat, pedigreed Burmese female, dble. champion, $25. Garden Grove, 539-9665. A

Honda, 1965, 50cc, elec. starter, windshield, $260. Inglewood, 754-3946. A

Chevelle Super Sport, 1965, 327 cu. in. 4-spd., $2375. Torrance, 329-9249. A

Cemetery Plot, 2, dble. interment, Inglewood Park Siesta sect., $950. Inglewood, PL 6-9532. A

Vacation Trailer, 15' Starfire, sleeps 5, water tank, butane stove, oven & light, $465. L.A., 756-3234. A

Mercury, 1951, recently o/hauled eng., new transmission, $100. L.A., PL 4-0078. A

TV, 21" Hoffman, mahogany console w/doors, $45. Gardena, OS 5-5258. A

Pups, silver miniature poodle, AKC reg., $125. Redondo Bch., FR 6-8327. A

Sailboat, 12' sidney, 18' mast w/trailer, $350. Inglewood, PL 1-8420. A

Row Boat, 12' aluminum Ward's Sea King, 1959 5½ hp Johnson outboard, $215. Manhattan Bch., FR 6-6002. A

Buick, 1963, Le Sabre h/top, auto. trans., r/h, p/b, p/s, w/s/w, air conditioned, e-z eyeglass, $2095. Redondo Bch., 378-9741. A

DeSoto, 1956, p/s, p/b, auto. trans., good body & tires, $75. Lawndale, 371-3991. A

Sloop, 24' Herreshoff, sleeps 3, galley, teak decks, inboard auxiliary, rare h/woods, many extras, $6100. San Pedro, TE 3-6037. A

Bicycle, boy's Huffy, $10. Brea, 529-3531. A

Table Set, 36"x36", w/8 chairs & 1 oak bench, $30. Gardena, DA 9-7447. A

Ford station wagon, 1958, rebuilt motor, 4 new tires, $600. L.A., 775-2827. A

Chevrolet Impala, 1961, h/top, p/s, p/b, $875. Torrance, OR 0-1515. A

Chevrolet, 1950 Powerglide, 2-dr. sedan, $65. Torrance, DA 4-9087. A

Ford station wagon, 1957, Country sedan, $300. Culver City, VE 8-9087. A

Drafting Machine, Brunning, plastic scales, $45. Bellflower, ME 3-6106. A

Styrofoam Boards, 1"x12"x12', $1.20 bd. Malibu, GL 6-2559. A

Ford, 1955, p/s, r/h, auto. trans., 4 chrome mags, $400. Hawthorne, 676-9394. A

Land, Antelope Valley, 5-acre parcels near Willow Springs, terms, $520 acre. Torrance, FR 8-1026. A

Enlarger, Lucky MK II condenser-type, 35mm-2¼"x3¼", w/standard lens & special lens, carrier for 16mm, $25. Box 2004. A

Corvair Monza coupe, 1965, auto. trans., all extras, new tires, $2095. Newbury Pk., 805-498-2529. A

Chair & couch set, Naugahyde, champagne biege, $150. Fullerton, LA 5-9633. A

MGA, 1958, convt., r/h, custom top, tonneau & paint, $975. L.A., 398-1458. A

Mobile Home, 2-bdrm., 12'x60', 50' awning, carport, skirts, redwood shed, furn. or unfurn., 2-yrs.-old, take over $92.50 mo. pymts., $1800. Torrance, 370-4101. A

Camper, 8½' Romer, full cabover w/jacks & other access., sleeps 4, $850. Hawthorne, 675-2329. A

SSB Transmitter, Health HX-10, never used, w/Hallicrafters SX-71 receiver & Mosley vest pocket, 20 meter beam, $300. Miraleste, 831-5407. A

Secretary desk, blonde, 3-drwr., pull down board for writing space, $5. Torrance, 327-3344. A

Plymouth, 1959, 6-cyl. stick, $258. FR 5-5760. A

Lot, Holly sect., Green Hills Memorial Pk., $300. Lakewood, 429-6843. A

Tape Recorder, Revere, 2-yrs.-old, takes 2" tapes, $60. Redondo Bch., 379-9278. A

Volkswagen, 1200, 1962, radio, w/w, new paint, $1250. L.A., 472-5284. A

Engagement Ring, diamond, ½-carat w/ matching wedding band, white gold, $175. El Segundo, EA 2-5930. A

Ford Victoria, 1953, auto., p/s, r/h, $125. Garden Grove, 537-5896. A

Chevrolet, 1953, Powerglide, r/h, $150. Torrance, 679-8374. A

For Sale

Bicycle, 24" Schwinn, girl's, 6-yrs.-old, $5. P.V. Ests., 678-6655. A

Surfboard, Bragg, 8'11" 22-lb. wt., 3½ thick, redwood strip, $65. Hermosa Bch., 372-6755. A

Hillman Minx, 1958, 4-dr. sedan, r/h, 35,000 act. miles, 1-owner, $200. Redondo Bch., 375-8132. A

Toy Poodle, AKC reg., papers & shots, black male, $50. Compton, 632-4978. A

Piano, baby grand, $425. Gardena, DA 4-8042.

Sewing Machine, portable, Montgomery Ward, used very little, $25. Long Bch., GA 3-1363.

House, 3-bdrm., 10 minutes from Northrop, den w/bar, 1¾ baths, outside rumpus room, pool-size yard, $29,900. Inglewood, PL 4-6079. A

Bicycle, girl's Schwinn, 24", $20. Inglewood, OS 5-6721. A

Volkswagen, 1200 sedan, 1965, many extras, 8,000 miles, $1700. L.A., 474-9790. A

Mercury Marc 55 w/controls & extra prop., $85. Box 2005. A

Wonder Horse, large, $5. Lennox, OR 2-2370.

Corvair Monza, 1961, low mileage, 4 sep. carbs., 4-spd., transistor ignition, radio, $845. Inglewood, 759-8920. A

Vauxhall, 1960, overhauled recently, $325. L.A., 645-8611. A

Coffee Table, built-in chessboard w/built-in drwr. for storage, teak & birch, $450. Manhattan Bch., FR 4-8236. A

Chevrolet, 1957, 2-dr. h/top convt., 301 eng., dual quads, 3-spd. floor shift, many extras, $700. Hawthorne, OS 5-7049. A

Tires, 2, 7.10x15 w/s/w, tube-type, $8. Gardena, DA 4-8853. A

Wanted to Buy

Lumber, reasonably priced, used, 2x4's, for son's home clubhouse building project. Hawthorne, 676-4536. B

Pup, Boston terrier, male w/out papers, & young Chihuahua female w/out papers, reasonable prices. Gardena, 329-9484. B

Butane Tank, oblong, 3-gal. Torrance, 323-9586. B

Rototiller w/or without attachments. Box 2006. B

Rentals Offered

Bachelor Apt., furn., light cooking, lge. closets, full bath, utilities pd., walk to Northrop, $70. Hawthorne, OS 5-3792. E

Apt., walking distance of Northrop, 2-bath, closed garage, $125 mo. Hawthorne, 676-9620. E

Studio Apt., 3-bdrm., 2 bath, unfurn., closed garage, pvt. patio, hot water & trash paid. Near schools & transportation, $175 mo. Torrance, FR 5-0867. E

House, 2-bdrm., fenced yard, gardener & water paid, $125 mo. Inglewood, OS 6-2162.

Share 2-bath, modern house w/2 working girls, Inglewood area, $60 ea. L.A., AX 2-6909. E

Apt., 1-bdrm., furn., closed gar., sound proofed, 10 mins. to Nortronics P.V., $100-$110. Torrance, 375-9397. E

Apt., 1-bdrm., water & trash paid, 1 block from Northrop, $92.50. Hawthorne, 676-1678.

House, furn., 2-bdrm., dble. gar., 4 blks to beach, $125 mo. Gardena, DA 4-7688. E

Apt., 1-bdrm., stove, refrigerator, ocean view & yard, $78. Redondo Bch., 372-8401. E

House, newly redecorated, 3 bdrm., 2 baths, unfurn., $140 mo. Newbury Pk., 805-498-3331.

Apt., 2-bdrm., 2 blocks from Plant One, free laundry facilities, furn., no small children, $150. Hawthorne, OS 9-7123. E

Apt., furn., 1-bdrm., ground floor, 1 block from beach, gar., $110. Torrance, 376-6137.

Apt., 2-bdrm., unfurn., water paid, gas for hot water paid, $110 mo. Redondo Bch., FR 9-9786. E

Apt., 1-bdrm., deluxe, built-ins, pool, $95 mo. Redondo Bch., 376-2117. E

Apt., 3-bdrm., unfurn., water & trash pick-up paid, closed garage, children OK, 12 mins. from Northrop, $135 mo. Redondo Bch., 370-7550. E

Cabins, Idyllwild, sleeps 6, fireplace, creek, $60 wk., $25 weekend. L.A., PL 4-5288. E

Apt., furn., 1-bdrm., convt. den, 2 baths, facilities, adults, $155. mo. Torrance, FR 5-5372. E

Bachelor Apt., furn., sep. bldg., walnut paneling, garden view, utilities paid, walk to beach, $100 mo. Hermosa Bch., FR 6-1636. E

House, unfurn., 3-bdrm., 1¾ baths, gar., fenced yard, near shopping, water paid, $130 mo. L.A., PL 4-1964. E

Apt., 1-bdrm., furn., pvt. deck, lge. pool, sub. garage, near Northrop, $145 mo. Lawndale, 377-4372, 679-7426. E

Child Care Offered

Child Care, 5 days a wk., lunch furn., $15 wk. Hawthorne, OS 5-9730. G

Personals

The sympathy & kindness extended to me in the recent loss of my mother was greatly appreciated. MARY NEIMEYER. L

Personals

Surfboard dings repaired by skilled craftsmen. Lynwood, 632-0642. L

Thank You sincerely for your kindness, flowers & expressions of sympathy when my mother recently passed away. Special thanks to all my friends in Production Planning for their solicitude. RANDY WALKER. L

I would like to thank those in the Computer System section, Nortronics, who expressed their sympathy at a time when it was deeply appreciated. WARREN HALL. L

For Sale or Trade

Chrysler, 1956, r/h, auto. trans., p/b, needs rings, $200 or trade for photographic or tape recorder equipment. Torrance, 371-8701.

Honda 250, Scrambler, $600 or trade for auto. Placentia, 528-2783. M

House, 4-bdrm., 2½ bath, fireplace, family room, sundeck, 2 yrs. old, $32,500 or trade for smaller 3-bdrm. home in South Bay Area. Redondo Bch., 370-9135. M

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:20 a.m.—4:05 p.m.

Prairie & 182nd, Torrance. Jane A. Grinnell, Mariposa, ext. 4035, 323-4209. 10

7:30 a.m.—4:15 p.m.

Marine & Highland Ave., Manhattan Beach. L. Berg, Norair, ext. 2763, 379-6762. 3

8 a.m. — 4:45 p.m.

Del Amo & Orange, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Rides Offered

8 a.m. — 4:45 p.m.

Del Amo & Orange, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

ACHIEVEMENT: Another Year Of Business Gets Under Way

(Continued from page 2)

visers are Hank De Bry, management, Dave Bean, sales, and Oliver Larsen, production. Verse Kraft will market decorative plaques and Christmas wreaths.

Custom-Craft is the firm sponsored by Nortronics Hawthorne that will market a serving tray. Its officers are Richard Newman, president, Janet Watters, treasurer, and Wilma Jussen, secretary. Advisers are Art Johnson, management, Harry Colgate, production, and Neal McKinzie, sales. Bob Sheetz serves as alternate adviser.

At Nortronics Anaheim the firm sponsored is called Trivco and will market a trivet and coaster set. Its officers are John Brown, president, Katie Heinz, treasurer, and Bette Peycke, secretary. Advisers are Cy Seeley, management, Leo Gross, production, and Adie Weishaar, sales. Alternates are Dave Harvey and Ira Coleman.

At Northrop Ventura the firm is called Conaco and plans to market initially a Christmas wreath. Officers are Tom Wilds, president, Jamie Strum, treasurer, and Ronalee Craig, secretary. Advisers are W. B. Knox, management, Richard Johnston, production, and Douglas Finch, sales.

Each Northrop division has at least one man who serves to coordinate Junior Achievement work. Bill Burch fills this post at Nortronics; Rollie Pontious at Norair; and Dick Davis at Ventura.

Last year the Ventura-sponsored firm was judged fourth among 182 Southern California JA firms and among the top 15 companies of 786 participating in 12 western states and two Canadian provinces.

Typical of Northrop management endorsement of Junior Achievement is a comment by George F. Douglas, Northrop vice president and general manager at Ventura, who said:

"We are most happy to continue our sponsorship of Junior Achievement. I feel there is no better way for our young people to understand the opportunities, problems and results possible under America's system of free enterprise."

SOME CATS WILL DO ANYTHING FOR RIPE BANANAS

Charlie is a civet cat, a vague relative of the raccoon and the skunk, adopted as a mascot by a Page Communications engineer assigned to a project in Southeast Asia.

Charlie is a hero today and has saved Northrop Page and the United States a great deal of time and money in a project which included running a new cable through an existing, buried four-inch duct between sites of communications equipment.

Faced with the prospect of tearing up the duct, the Page engineer decided to give Charlie a chance first. The engineer tied a piece of twine around Charlie's neck and set him down at the conduit's opening.

He tossed a bunch of bananas into the opening, and away went Charlie. Then the engineer, George Stelljes, clamped a board over the opening.

Now Charlie likes to eat his bananas in the wide open spaces, so he took off for the other end, dragging the twine behind him.

It was a simple matter then of attaching the cable to the twine and pulling it through.

All it cost was a reward for Charlie — a shrimp dinner.

FRINGE BENEFITS

(Continued from page 2)

of our earnings above the Social Security base.

A further item requiring attention is that minimum pensions in many plans have not kept pace with the declining value of the dollar in terms of purchasing power.

Assuming that we get whatever stockholders' and governmental approvals are necessary, Northrop proposes to do something about each of these situations. Some of you may have seen the Proxy Statement for this year's December 14 stockholders' meeting which has just been sent to all stockholders, in which our management requests approval of certain suggested amendments.

The next article of this series will discuss these and previous changes including the "final average benefit", the "retention of the present Social Security base", the "magic 85 early retirement formula", and the "minimum monthly pension".

SCOUTING RECOGNITION

J. M. Ricketts (left), Nortronics deputy manager of Operations, and Douglas Leavenworth, chief of Field Support, are shown with Eagle Scouts Michael Eliott, Curtis Dahlberg and Randall Hermann. Nortronics men were among business and industrial leaders who hosted youngsters who have attained scoutdom's highest rank at annual Northern Orange County Council recognition dinner.

Cub Scout Program Has Den Openings

Northrop personnel associated with the Cub Scout program may be interested in affiliating their youngsters or groups with an NRC-sponsored group known as Cub Pack 262c.

Under NRC guidance, this group has been active for the past 10 years and currently has openings for dens from the neighboring areas. Special Pack meetings are held the last Friday of each month at the NRC Clubhouse, Hawthorne.

Dave Yarborough will be glad to discuss this program with those contacting him, 676-5119 evenings.

Blue Book Service Offered Buyers by Credit Union

Northrop Credit Union has completed arrangements to provide a special service to would-be buyers of 1966 automobiles.

Copies of the 1966 Kelly Blue Book Invoice Service have been obtained. This publication lists the actual cost and the suggested retail (dealer's) price of all makes and models as well as available accessories.

Mary Delaney, Credit Union assistant secretary, plans to call at three Nortronics facilities during lunch periods on specific dates to make the publication available to employees. She will also provide "work sheets" on which to jot down information. And she can give detailed information to those who wish to utilize the Credit Union's low automobile financing plan, available only to employees.

Mrs. Delaney will be at the following locations during lunch periods on the dates noted: Nortronics Hawthorne, November 18; Nortronics Palos Verdes, November 19; and Nortronics Anaheim, November 22. She may be contacted at Personnel or Personnel Activities offices.

Copies of the publication will be retained at these locations for subsequent use by employees after these dates.

Northrop Norair employees will receive the same service at any time during normal Credit Union hours at the central office, located at Plant One.

In addition, a special copy of the publication is being reserved for use at other Northrop facilities upon request.

PEARLS: Russ Black Has Probed Secrets of Gem for Nearly Two Decades

(Continued from page 1)

He was especially interested in the grading system employed. He noted how the top quality pearls were broken into four grades, based on such variables as their color (from deep pink to white), luster, flaws, roundness, weight and size. He also found a similar system was used in grading the remaining pearls.

To Russ one of the most startling discoveries was the fact that the four top grades are rarely ever shipped from Japan.

"There is no trickery involved," Russ says. "In fact, the Japanese government controls the pearl export market very closely and insures prices are commensurate with quality."

However, this factor became to Russ a strong indication of the apathy of the world's consumers of pearls, extending through the jobbers, distributors and ultimate consumer.

"At each point people buy pearls more on blind faith than anything else," Russ says. "Fortunately, the Japanese controls and the integrity of most sellers protect the consumer. But the consumer really knows very little about what he is getting."

Among misconceptions Russ has encountered is the belief that cultured pearls are imitations. In truth they are the end product of a scientific and exacting business to produce the world's best pearls. Natural pearls, on the other hand, are just that—pearls created without man's help.

Two popular types of pearls, the so-called black pearl and the Baroque, are really freaks of nature. The Baroque is a pearl that is without true symmetrical shape, and only when the normal metabolism of the oyster goes haywire is the off-colored, or black pearl, produced.

During the more than seven years Russ has worked with Northrop he has continued to pursue his knowledge of pearls.

He and his wife have also operated a small, and exclusive pearl import business on the side. They obtain their pearls direct from a Japanese pearl farm and limit their purchases to the top four grades of pearls, those normally retained in Japan. They use them to make strands, jewelry, rings, etc. to order.

Russ Black and Lois Zwinggi, both of Nortronics Hawthorne, show interesting jewelry featuring pearls. Mr. Black imports pearls direct from Japanese farms, makes and markets his own jewelry in his spare time. He has devoted almost 20 years to studying pearls.

ALOTS

(Continued from page 1)

of the entire system had qualified at home, home being Nortronics Research Park, Palos Verdes.

Here Mr. Gantz and his Range Instrumentation unit brought the individual subsystems through their birth pangs into a system that is expected to produce optical resolution in the neighborhood of 2 seconds of arc on a 70 mm frame.

In the final tests, ALOTS will fly on the KC-135 while five miles away a B-57 bears a National Bureau of Standards resolution test chart about three inches square. It is the tracking system's job to photograph clearly the images on this three-inch card from that five mile distance, tracking the B-57 as its relative position varies.

According to Mr. Gantz, the achievement of photographic resolution of this excellence from an airborne platform represents a very significant achievement in the state-of-the-art.

At least eight flights are planned in the acceptance test series.

During tracking of actual missile launch and recovery, color film will be used in the ALOTS camera.

NRC ROUNDUP

Coin Club Schedules Christmas Giveaway

The spectacular rise in popularity of the Nortroncis Anaheim Coin Club over the past year and a half has been attributed by Commissioner Orville Mitchell to "giving the members what they want," and it takes only a quick look at plans for the Club's first annual Christmas party to see what he means.

Door prizes valued at $1000 will be given away December 14 when the Club takes over the NRC Clubhouse for its biggest event of the year.

Which ever one of the nearly 200 members wins the first prize, valued at $500, probably won't mind that it's all in pennies. Not 50,000 of them, but less than 200 actually. The prize is a complete set of Lincoln cents, including a 1909-S (VDB) penny valued alone at $200.

But the big prizes are not all that has sparked the Coin Club to grow from a score of members less than two years ago to the current roll of 200.

Guest speakers, informative group discussions, quizzes about coins, informal sociability, and a lot of horse trading has added to the popularity of the hobby at Anaheim. The giveaway program is not just a once-a-year event either. The Club meets twice a month and $100 worth of door prizes is standard procedure at each session.

Frequent auctions by members provide a rare market for collectors, and the Club is building a library of reference books on coins.

Mr. Mitchell is an 18-year Marine veteran who has collected coins all over the world since 1939.

While Mr. Mitchell doesn't pass up a good opportunity to sell, he says he's still in it as a hobby. He gets a bigger thrill out of finding an unusual coin in a pocketful of change than buying on the coin market for future profit.

"Once in Puerto Rico," he recalled, "I received a 1901-S quarter in change from a purchase. At that time it was worth $120."

* * *

Coin Collectors Join Hawthorne Exhibit

Northrop Coin Club is cooperating with the Hawthorne Chamber of Commerce in presenting the second annual Hawthorne Coin Exhibition Friday, Saturday and Sunday.

To be held at the Hawthorne Memorial Center, Prairie and El Segundo, the exhibit will be open from 10 a.m. to 10 p.m.

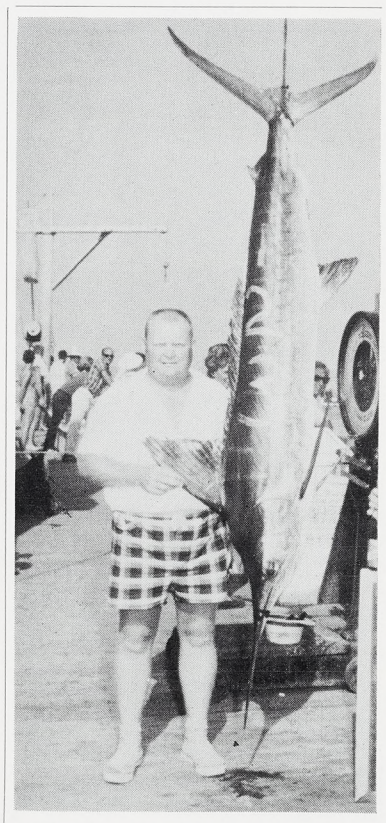
Frank Farmer, Coin Club president, reports Northrop collectors will show their coins along with approximately 100 others. In addition, coin dealers from 13 states and Canada, approximately 80 of them, will be on hand to display coins.

* * *

Harvest Moon Ball Tickets Still on Sale

Tickets remain on sale through NRC outlets this week for the special Harvest Moon Ball to be held Saturday night at NRC Clubhouse, Hawthorne.

Sponsored by NRC bowling leagues and open to all Northrop folk, the event will feature the music of Gary Adams Quartet. Tickets sell for $1 per person.



After six years of trying, Bill Wilson, member of Northrop Sea Anglers at Nortronics Hawthorne, took his first marlin, this 123 pounder.

Two Groups Plan Holiday on Road

While many Northrop families will enjoy the upcoming long Thanksgiving holiday at home or with nearby loved ones, at least two NRC activities plan to "hit the road" for special events.

Twenty-three owners of trailers and campers from throughout Northrop will trek southward to Ensenada, Mexico, to take part in a "Fiesta on Wheels" event there. They will enjoy a number of special events.

Sponsors are the NRC Trailer and Camper Club at Nortronics Anaheim. Because of the need for early reservations, no additional trailers can be accepted at this time.

However, another activity, a joint NRC Gem and Mineral Club visit to the Ogilby-Wiley Wells area is still open. Norair and Nortronics "rockhounds" will gather on Indian Pass Road for a four-day campout.

Special interest will center in collecting palm root, fibre, dumortierite, jasper, agates, etc. NRC offices can supply additional information on this event.

United Crusade Support Lauded

Northrop employees who support many community health and welfare organizations through their contributions to AID-NOR-AID each week were given the United Crusade's "Outstanding Service Award" at a recognition luncheon at the Statler-Hilton Hotel.

Clifford Tweter, presiding campaign chairman for the United Crusade drive in progress, presented the award and recognized the long-time support of Northrop employees to this vital community drive.

He noted that the recent AID-NORAID campaign resulted in an increase of 24 percent in participation and 43 percent in contributions. He also noted employees had pledged $80,000 above their pledge of the past year.

NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California | Vol. 23, No. 21 | December 8, 1965

Navy to Test Voice Alert Unit on Planes

An advanced version of the voice warning system which alerts Air Force B-58 bomber crews to emergency conditions during flight will soon be evaluated for application to Navy aircraft.

The Nortronics Division of Northrop Corporation will provide 34 of its Mark I voice warning reproducer sets to the Navy Bureau of Weapons for flight testing aboard Navy P-3s, F-4s and A-5s. The voice-alert units will augment present in-flight monitoring systems, such as instrument panel warning lights. The taped messages will be varied in order to determine specific aircraft requirements.

Through a network of remote fault sensors, the Mark I will directly monitor airframe condition and aircraft system status. When a hazardous condition occurs, a recorded message describing the problem will immediately be transmitted to the crew, over standard communication headsets, and repeated until the problem is corrected.

BULLETIN

Northrop Nortronics' Airborne Lightweight Optical Tracking System (ALOTS) was successfully tested during the launch of Gemini 7 spacecraft last Saturday.

Flying in a KC-135 aircraft at 41,500 feet, ALOTS acquired the Titan II booster as it broke through dense cloud cover above Kennedy Space Center. The system automatically traced the flight until the first stage Titan separated at about 100 miles altitude.

This was the first time Gemini staging was recorded visually. The Air Force Eastern Test Range plans to use ALOTS to track Gemini 6.

THE WORLD OF INNER SPACE

Artist's concept shows various phases, operations and goals of Navy's Deep Submergence Systems Project (DSSP), of which Northrop Nortronics is prime management and engineering support contractor. Four major phases of the program are submarine rescue, large object recovery and salvage, deep ocean exploration, and continental shelf sea lab stations for man-in-the-sea programs. The "city in the sea" (background) is not part of the DSSP, but will be more feasible as the result of technologies and equipment developed by the program. Work is currently being performed at Anaheim under the direction of A. E. Krapf.

SIX EMPLOYEES HONORED FOR 25 YEARS' SERVICE

Comments of two guest speakers and the presentation of Northrop 25-year service emblems to six veteran employees were highlights of a November 16 meeting of the Nortronics Management Club held at the Long Beach Elks Club.

U.S. Congressman Alphonzo Bell and Earl Smith, president of the Western States Bureau of Investigation, were the guest speakers.

Congressman Bell briefed club members on such important topics as the U.S. space program, manpower development and re-

(See AWARDS, page 6)

Broader View of Aerospace Industry Urged by T.V. Jones

Northrop President and Chairman Thomas V. Jones told Southland business leaders November 17 that the aerospace industry was no longer a boom-or-bust business and should be viewed in much broader terms than just defense.

"The industry that we call aerospace embraces the entire space program, airline transport —both passenger and cargo. It includes to an increasing extent sea transport, both surface and undersea. It includes very important segments of the vast communications industry.

"You will find in it important activities dealing with the exploration of undersea space, desalination of water, automatic test equipment, special purpose computers, and a wide variety of other contributions to our dynamic industrial society," Mr. Jones said.

"Indeed, when you look at the capability of our industry . . . it should more properly be known as an advanced technology industry and its future potential goes far beyond the needs of the defense program."

Mr. Jones spoke on behalf of the aerospace industry at a day-long conference of the 17th annual Business Outlook conference sponsored by the Los Angeles Chamber of Commerce. More than 700 businessmen attended the conference which heard such speakers as Lynn A. Townsend, president of Chrysler Corporation.

As for defense, Mr. Jones said it is about time that thoughtful people recognized that there have been deep and meaningful changes which should by now have dispelled the boom-or-bust image.

Mr. Jones pointed out that defense expenditures in the past have dipped to a low ebb in peacetime and skyrocketed in wartime ($1.5 billion in 1940 and $81 billion in 1945, for example). But since 1953 they have held fairly steady in the $40 to $50 billion range.

Dividend Declared

The Northrop board of directors has declared a quarterly dividend of 25 cents per share, payable December 11 to stock of record November 26.

RNAF Stock Purchased for $2.32 Million

Confidence in the sustained growth of overseas industry was expressed again last month by Northrop when the company purchased 3600 common shares and 16 preference shares of the Royal Netherlands Aircraft Factories (Fokker) for $2,320,000.

The stock, which represents 20 percent of the common shares and 32 percent of the preference shares, was purchased from the RAC Corporation, formerly Republic Aviation Corporation.

Headquartered in Amsterdam, Royal Netherlands Aircraft Factories (RNAF) manufactures the F-27 twin engine commercial airline and military transport aircraft. RNAF is main contractor in an international production program for F-104G Starfighters and is participating with Belgium, German, and French firms in development and production of a maritime patrol aircraft.

The company also manufactures plastic aircraft parts, radomes, radar antennas, sailing yachts and other industrial products.

RNAF has participated in preliminary activities on a satellite program under the auspices of Euro Space Technology Center.

In announcing the purchase, Northrop President and Chairman Thomas V. Jones said the shares were obtained as "an investment in a leading aircraft company occupying a strong position in the European Common Market."

Adopt a Family Program to Aid Needy Under Way

Over the past 11 years Northrop Nortronics personnel have established a tradition of helping others less fortunate at Christmas time.

Throughout Nortronics, in shops and laboratories, offices and production areas, steps are now being taken to continue that tradition. Some groups are adopting families and supplying all the elements of a Merry Christmas with gifts, clothing, and food. Still others are electing to contribute money to be used to assist charitable institutions, hospitals and the like.

Last year was a typical one in the generosity of Nortronics people. At Anaheim some 26 families were "adopted". At Palos Verdes and Hawthorne another 20 families were helped. Some were fellow employees, others were needy families in the community.

There were also special gifts, services and collections going to outside groups.

Personnel Activities at Anaheim, Palos Verdes and Hawthorne coordinate the efforts at those facilities assisted by Joan Jones and Jeanne Andrecht at Palos Verdes and Hawthorne.

MUNDAY'S SHOP IS SHIP SHAPE

Yo Ho Ho and a Bottle Full of Sails

Conspicuous in the decor of Joe Munday's bachelor apartment is a five-gallon jug, usually filled with wine.

Don't get Joe wrong now, he doesn't much care for the stuff and hosts an occasional party just to keep the contents down to a working level.

Joe is interested, however, in bottles.

He finds a certain wine comes in just the right type of container. So he buys frequently, dumps the wine in the big jug and uses the bottle in his hobby-business.

He builds miniature sailing ships inside the bottles.

After completing a work day in data control at Northrop Nortronics' Hawthorne facility, Joe heads for home and a new identity—as owner, designer and total work force in Munday's Bottle Ship Shop. It's located in his apartment.

Over the past two years Joe has completed about 14 projects, most in half-gallon wine bottles. He markets his creations through interior decorators and normally starts one only on special order. Business has picked up and he was forced recently to spend his entire vacation filling back orders.

"Two years ago I decided to buy a bottled ship for my apartment," Joe says. "The few I found were priced out of this world. That's when I resolved to build my own. Things have grown from there."

Joe spent several months researching sailing vessels. He found information skimpy and only one bottled ship builder on the West Coast. But he did make some contacts in his quests. His most popular models are two and three-masted Barques and replicas of the "Flying Cloud" clipper ships. He also created a sloop used by Scandinavians in seeking a northwest passage to the West Coast. And he is currently in the middle of a six-month project to build a scale model of the HMS Bounty in a 13-gallon former acid bottle. The cost: $500.

Tools are fashioned by hand for each job and include cutters and probes and rods of wire. He uses a hand drill as a lathe.

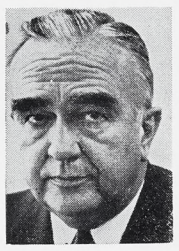
Finding just the right bottle—the hardest part of the entire project—is followed by detailed layout of all parts and components, sometimes numbering into the hundreds. Joe fashions each piece individually, then joins as many as he can, always working with the size of the bottle opening in mind.

His hulls, built in two pieces, are made of hard pine. Wood dowels become the masts. Medical swab sticks are used for spars. Thread makes up the lines and rigging. He makes sails of silk span. A small bit of colored win-

(See BOTTLES, page 6)

FRINGE BENEFITS

Improved Retirement Plans Await Confirmation

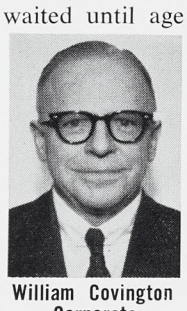


By WILLIAM LARRABEE
Vice President—Industrial Relations

The November 17 article in this series pointed up some changes which your management contemplates in our Retirement Plans, assuming appropriate stockholder and governmental approvals. Each of these changes is part of a total package designed to improve retirement benefits for eligible people retiring under the two primary Northrop Plans after the changes become effective. Detailed amendments will be available when they are approved and will be controlling, of course, but in the meantime, some general explanations might be helpful.

Let us talk first about early retirement. Under the Plans as they now stand, a person age 55 or over with a minimum of 10 years of continuous service can retire early and begin drawing retirement pay at once. As a practical matter, however, very few people do so because the amount which they receive is cut back so heavily through reduction based on actuarial tables.

As an example, let us assume that Mr. "A" wants to retire at age 55 by reason of health or other personal considerations which would make it necessary for him to leave the company. Let us also assume that up to that point he has "earned benefits" which would pay him $100 a month if he retired and waited until age 65 to start the payments. If Mr. "A" retires early and starts his payments at age 55, he will get only about $45 a month instead of $100 because of the actuarial reductions. This is understandable because the pension has to be paid for 10 more years than would have been the case if he waited until age 65 to start payments.



William Covington
Corporate administrator
Retirement Plans

In order to help people in this situation, your management plans to adopt what has become known as the "Magic 85" formula coupled with a "two and one-half percent flat reduction" instead of an "actuarial reduction." In order to understand how this works, let us take our same Mr. "A" who had the earned benefit of $100 and who is age 55 with at least 10 continuous years of service. If Mr. "A" had 30 years of continuous service, his age (55) plus his service (30) would equal 85 and he could retire early under the "Magic 85" with his full earned benefit of $100 a month when he retires.

If he had 25 years of continuous service, his age (55) plus his length of service (25) would give him 80 points. He could then retire with his $100 a month less two and one-half percent for each point which he is short of 85. Since he is short 5 points, he would get his $100 less 12½ percent, or $87.50. In short, under the "Magic 85" formula, a person eligible for early retirement adds his age to his length of continuous service, and if the result falls short of 85 he can tell exactly how much his earned benefit will be reduced by multiplying the difference by two and one-half percent.

That is not all of the story. There are some people in the age 55 to 65 group who will not have accumulated nearly 85 points but who will have satisfied all other requirements for early retirement. Let us assume that Mr. "B" wants to retire at age 60 but has only 10 years of continuous service. Since age 60 plus 10 years service gives him only 70 points, the "Magic 85" does not help him. He can turn, however, to the "two and one-half percent flat reduction".

Under this formula, our Mr. "B" can nonetheless retire early at a flat reduction of two and one-half percent for each year that his age falls short of 65. Since Mr. "B" is 60, his $100 a month will be reduced by 12½ percent to $87.50 a month compared with $65 per month he would get now. It can be readily seen, therefore, that every early retiree stands to gain over the present plan. The biggest reduction that the early retiree can take from his earned benefits is 25 percent, and if he has enough points under the "Magic 85" formula, he will take no reduction at all.

One thing should be made clear before we leave this phase of the program. Some people are under the impression that if they retire early with 85 points they would get the same amount of pension as they would have received if they worked through to age 65. This is not correct. The early retirement benefit continues to be calculated on the benefits earned before the date of early retirement. If he continues to work he will, of course, build up more earned retirement benefits each year as his working life continues until he reaches normal retirement age.

So much for early retirement. Let us now look at the complicated problem which arises by reason of the change effective January 1, 1966 in the Federal Social Security base. In common with many plans, Northrop's retirement benefits are computed in part upon a percentage of the compensation which each of us earns over and above the Social Security base established by the Federal Government.

At the present time Northrop and its people are taxed on the first $4800 of the employee's earnings each year for Social Security. $4800 is thus the present Social Security base. As of next January 1, the new law will increase this base to $6600. Thus, as the base increases, the amount which the employee receives as a percentage over the base decreases. Northrop wishes to continue to use the $4800 figure for its pension computation purposes in order to prevent any reduction in the rate of accrual of benefits in future years.

The remaining changes are of great importance to our hourly-paid personnel and, in combination, represent a Northrop "first" in our industry. The first of these has to do with minimum pensions. Briefly, our present Hourly Plan provides a minimum retirement benefit of $2.50 per month per year of service, with a maximum of 30 years for accumulation of this benefit. The revision increases the minimum pension for people becoming eligible after the effective date to $3.75 per month per year of service, and increases the maximum period to 35 years.

In combination with this and in recognition of the contributions which its people of long service have made to the company, our management plans to install what is called the "final average" computation in its Hourly Retirement Plan as it has already done in its Salaried Plan. This means, in substance, that an eligible person's pension will be based upon the average base amount which he has earned for his best five continuous years out of the last 10 years of employment, instead of on his actual base earnings back to the inception of the Plan.

All of us who have been around for a while can recall that wages generally are a good deal higher now than they used to be. This change, therefore, cannot help but benefit Northrop people. There is one more important aspect to the change. Northrop believes that people deserve to be treated as individuals and that individual initiative in working toward better and higher paid jobs should be recognized. Hence, if a man has a reasonable minimum pension and is left free through "final averaging" to better his retirement through earning better wages and promotions, he has the satisfaction of seeing his efforts rewarded.

As was stated initially, all of this planning is subject to various approvals. We are hoping for effective dates of February 1, 1966, but at the proper time detailed announcements will be made, including effective dates, eligibility, and other pertinent factors.

There is one more issue of the NORTHROP NEWS before our Yearend Holiday. Perhaps that would be a good time to talk in the spirit of Christmas about some of the nice things which we Northrop people do for others, not only at Christmas time but throughout the year. When we get back to work again, we can then discuss more of our fringe benefits and some additional things that are going to happen in this area.

FREEWAY ROUTE SELECTED BY STATE WILL UPSET WORK

The California State Highway Commission has selected a route adjacent to Nortronics Hawthorne for the portion of the Century Freeway known as Freeway Route 42.

Commenting on this decision as it affects Northrop Corporation, George Gore, Corporate vice president, general counsel and secretary, said: "the location of the freeway along the route selected will place it so close to the company's facility at Van Ness Avenue and 120th Street that vibrations emanating from the freeway will disturb the work performed on delicate instruments in the facility and could cause the company to incur very substantial costs — perhaps as much as $1 million—to relocate the work."

Representing Northrop at a recent State Highway Commission hearing, Robert B. Watts, jr., assistant general counsel, had reported that the freeway path since selected would interfere with the work because it would pass within 140 feet of the Nortronics building.

The route adopted by the Highway Commission runs eastward from Sepulveda, then turns southeast before crossing Hawthorne Boulevard. From this point it runs adjacent to the Hawthorne Municipal Airport and the Northrop property until reaching the area of Western Avenue, then jogs northward again.

In addition to interfering with work in the Nortronics building, the route would absorb a small portion of the Nortronics property at its northwest corner for an on-ramp.

Alternative paths for the freeway section would have followed closer to Century Boulevard, away from the Northrop property.

25 YEARS

George Gore (left), general counsel and Corporate secretary, receives his 25-year pin from Northrop President and Chairman Thomas V. Jones during recent Beverly Hills ceremony. Mr. Gore joined Northrop in 1940 as its resident legal counsel. He was elected secretary in 1945. He was appointed to his present position in January of this year.

1st Quarter Sales Hit $70.4 Million

Northrop consolidated sales totalled $70,439,000 for the three months' period ended October 24, 1965, Thomas V. Jones, president and chairman, announced recently. Consolidated net income for the quarter totalled $1,691,000, equivalent to approximately 41 cents per share on the 4,160,636 shares outstanding.

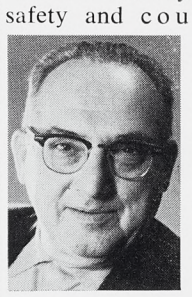
In the first quarter of the prior fiscal year, Northrop had $72,433,000 in consolidated sales and consolidated net income of $2,007,000, equivalent to 49 cents per share on the 4,092,739 shares outstanding a year earlier.

The company's sales backlog at October 24 totalled approximately $285,000,000, compared with approximately $288,000,000 three months earlier.

The backlog still does not include approximately $100,000,000 of contracts already in work which have not been finally negotiated, according to Mr. Jones.

MORRIS SCHECHTER NAMED HEAD OF SAFETY PROGRAM BY PYTHIANS

Young drivers who are just getting ready to plunge into the freeway maelstrom for the first time are the object of a highway safety and courtesy program headed in California by Northrop Ventura's Morris Schechter.



Mr. Schechter

The program is actually nationwide, sponsored by the Knights of Pythias, a fraternal society founded in 1864. Mr. Schechter, a past chancellor of the Woodland Hills Centennial Lodge 408 of the society, has been appointed state chairman.

The program consists of a poster contest open to all students in junior and senior high schools in the United States and Canada, who will be competing for more than $1000 in prizes. Awards will be made on state and national levels.

"We wish to emphasize that learning to drive is more than knowing how to shift gears," Mr. Schechter said this week. "Our private study of police records of accidents reveal that most accidents could have been avoided if drivers had merely observed 'the rules of the road.' "

In line with the program purpose to promote safety thinking by students and the means by which accidents can be prevented, the poster message must reflect the causes and/or prevention of highway accidents.

Mr. Schechter, an air conditioning mechanic on the third shift, encourages parents of interested students to obtain copies of the contest rules by writing him at 14955 Dickens Avenue, Sherman Oaks.

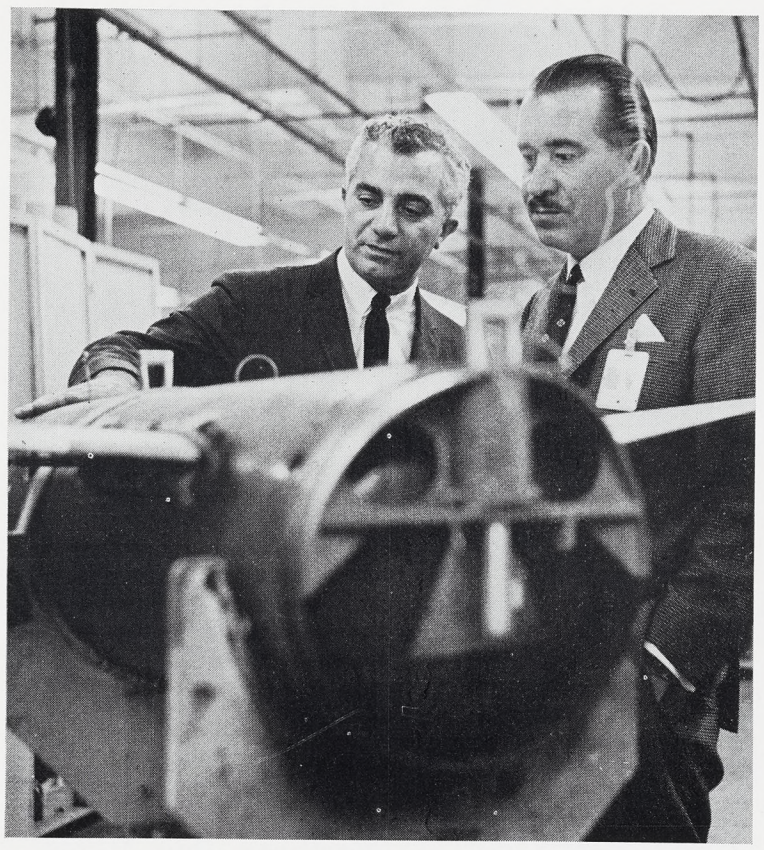
Two fellow Northrop employees—Paul Friedman, 6163 White Oak Avenue, Reseda, and Ray B. Bourland, 6302 Caroline Avenue, Simi—are also equipped to answer inquiries. Contest rules also have been posted on all safety bulletin boards at Northrop Ventura.

Posters submitted in the local contest will be displayed in the Northrop Ventura cafeteria until time for judging.

The program is being supported by driver education instructors throughout the Los Angeles County area school systems, Mr. Schechter said, as well as news and radio media.

The local contest closes December 31, and winners will be eligible for the national contest to be held in June 1966.

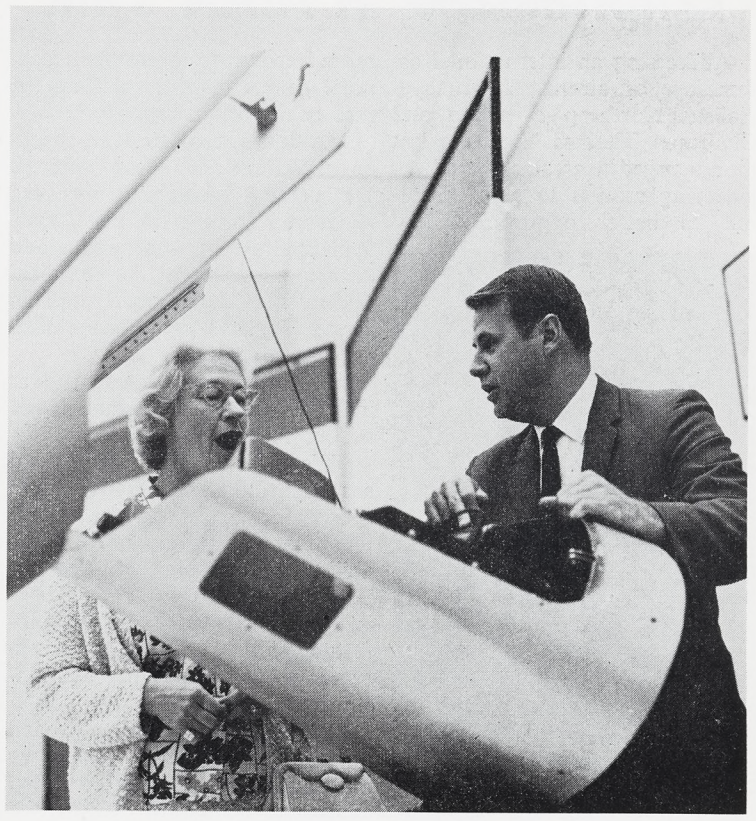
THE WELCOME MAT



A. P. Buchiarelli (left), senior Marketing representative with Northrop International, conducts tour of Northrop Ventura drone manufacturing facilities for Adolf Galland, Northrop Corporation consultant in Germany. A retired general officer, General Galland was promoted to lieutenant general at age 29, becoming the youngest three-star general in the German Air Force. In photo below, three executives from SINTRA, electronics company in Paris, are briefed on Northrop Nortronics capabilities by R. E. Ringle (left), Marketing representative, at Palos Verdes. The executives (right to left) are George Granjon, Louis Chambeau, and Pierre Abraham. The visitors were briefed at Nortronics Anaheim as well and were especially interested in automatic checkout equipment, microelectronic applications and computers and display systems.

Fortnight in Review

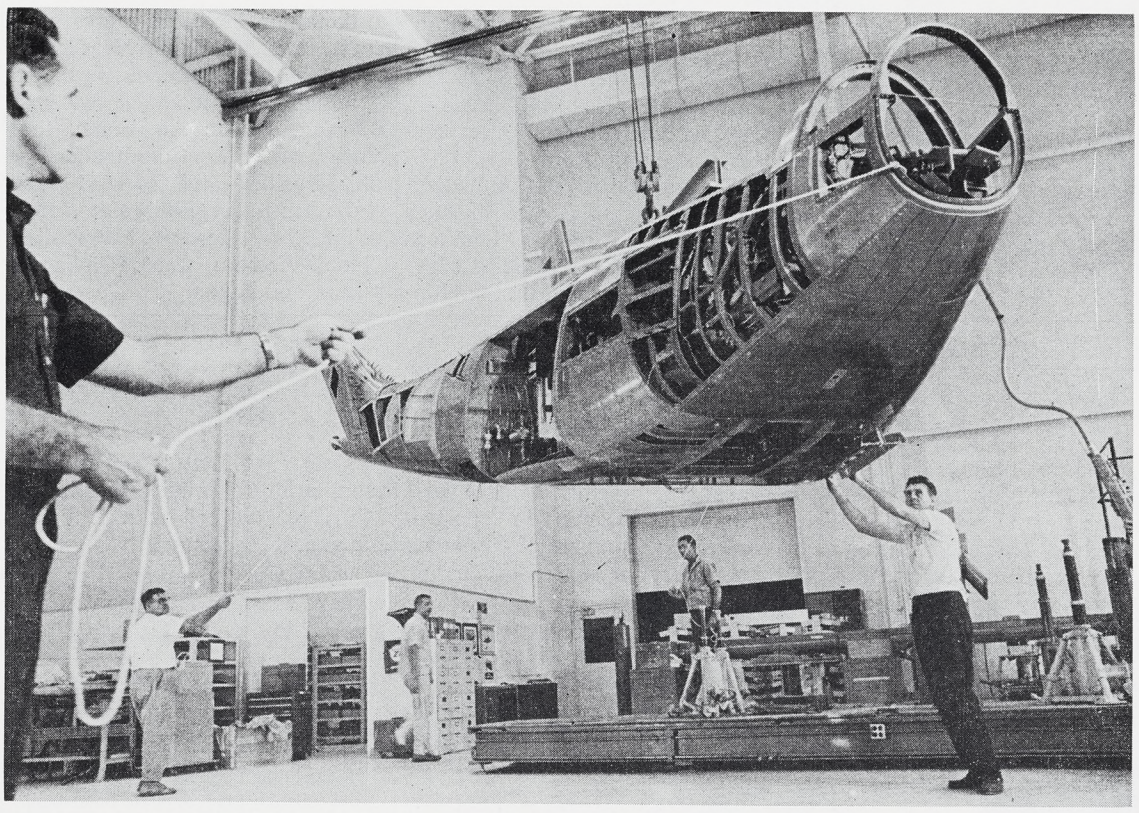
Mrs. Eleanor Willard (at right) who participated in Business-Industry-Education Day at Northrop Norair recently is agog at reconnaissance nose developed for F-5. Fritz Probst of Customer Relations is the demonstrator. In another kind of demonstration, Pete Vogel (below), advertising manager at Northrop Architectural Systems, takes the wheel of the schooner Polynesia, one of the largest sailing ships in the world, during a 10-day Bahamas cruise. The vacationing Mr. Vogel was a paying "crew member" in a unique arrangement which allows amateur seafarers to test their nautical skills.



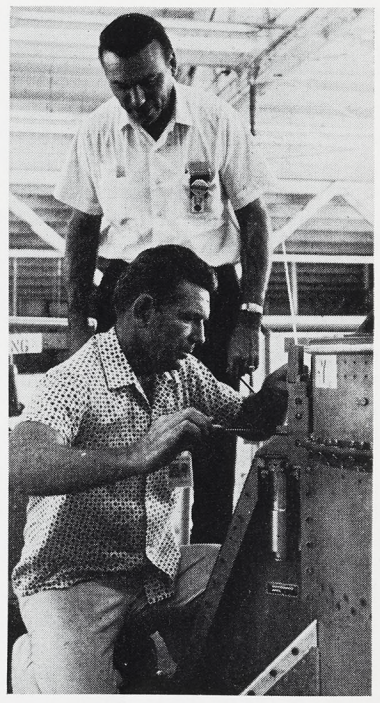
EAGLES AND FRIENDS

Elmer Noonan, Northrop Nortronics director of Industrial Relations, congratulates Eagle Scout Robert G. Alleman (photo above) and Johannes S. Newton, Northrop Norair senior technical specialist, gives a pat on the back to Lee A. Morris (below) at recent recognition dinner for youngsters who have attained scoutdom's highest rank. Mr. Noonan and Mr. Newton were among 500 industry representatives who served as host for new Eagles.

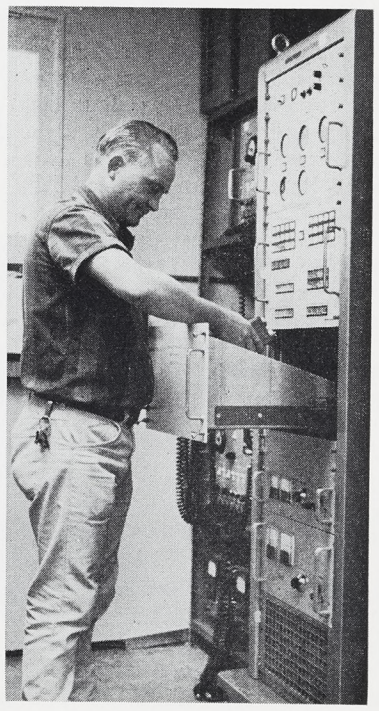
HL-10 TAKES TO "AIR"



Northrop Norair technicians handle guide lines as HL-10 lifting body research vehicle is removed for its assembly fixture. Vehicle, second of its type built by Norair for National Aeronautics and Space Administration, is currently going through final stages of assembly. It is scheduled for mid-January delivery. Meanwhile, first vehicle, the M2-F2, is nearing date for its first high altitude manned captive flight at NASA's Flight Research Center, Edwards Air Force Base. Both vehicles will be used by NASA in furthering the art of returning manned vehicles from space.



With fifth in a series of tests of Apollo emergency escape system scheduled this month at White Sands, New Mexico, combined with continuing drop tests of parachute landing system, activity at Northrop Ventura's El Centro Field Test Unit facility has been accelerated considerably. As is done before each Apollo test, Ralph Voorhees prepares apex cover ejection system (above) while North American engineer, Hal Neuman, observes. Clay Robinson, electrical crew chief, tests automatic sequence controller (below).



MEETINGS

Value of Working Models Emphasized in AIAA Talk

Addressing an international assemblage of aircraft design specialists, Northrop President and Chairman Thomas V. Jones last month urged a greater use of engineering models to give inventors "a better opportunity and more freedom to direct their technical genius toward fulfilling the real needs of our society."

Northrop President and Chairman Thomas V. Jones addresses AIAA Aircraft Design and Technology luncheon.

Mr. Jones was luncheon speaker November 16 at an Aircraft Design and Technology meeting, sponsored jointly by the American Institute of Aeronautics and Astronautics, Royal Aeronautical Society of Great Britain, and the Japan Society for Aeronautical and Space Sciences.

The three-day meeting was held at the International Hotel in Los Angeles.

"We may be placing too great a responsibility on analysis as a means for estimating the potential of a new development or its ability to achieve a specified objective," Mr. Jones said. "There is still much value in the old-fashioned method of gaining acceptance by an actual demonstration.

"We have greatly sharpened our tools of analysis and yet we must not let our sophisticated analytical techniques obscure the power that lies in a physical demonstration by a working model."

Heading the U.S. delegation to the international meeting was Northrop Senior Vice President Richard E. Horner, national chairman of the AIAA. Sir Walter Cawood of the Royal Aeronautical Society led the British delegation, and Hiroshi Nakaguchi headed the Japanese group.

More than 100 technical papers were presented, including one on the Northrop F-5 by Welko Gasich, Norair vice president and assistant general manager—Technical.

Darrel L. Hirsch of the Norair Technical Management staff and R. L. McCormick, senior engineer, co-authored a paper on experimental investigation of pilot behavior in a PIO (pilot induced oscillation) situation.

The Management session was chaired by Milt Kuska, Norair deputy assistant general manager-Technical.

Charles W. Eyres, assistant to the vice president and assistant general manager—Technical, was general arrangements chairman for the over-all meeting and was chairman of a special program on the F-111 and C-5 airplanes.

Transport Range Boosted by LFC

A 35 percent gain in range for long-range transport airplanes using laminar flow control on the wing is expected, according to an article by Northrop Norair's Ruediger E. Kosin in the AIAA Journal of Aircraft.

Mr. Kosin, former director of X-21A engineering and now technical assistant to the Norair vice president and assistant general manager-Technical, reported on five years of research by Northrop into application of the laminar flow control (LFC concept, including flight tests of the X-21A, an 80,000 pound jet aircraft designed and built by Northrop).

In comparing LFC with conventional aircraft, Mr. Kosin said the 35 percent gain could be made in range with comparable payload, or a 35 percent gain in payload within comparable ranges.

The most significant feature of LFC wings is rows of tiny slots running spanwise along the upper and lower surfaces. Boundary air is inhaled through slots and expelled to the rear by use of compressors mounted in wing pods. The process prevents buildup of high-drag turbulence and allows a smooth flow of air over wing surfaces.

Data contained in Mr. Kosin's article is based on years of preparatory work in wind tunnel testing and analysis and a flight test program at Edwards Air Force Base using a modified Air Force WB-66D aircraft.

The Aeronautical Systems Division of U.S. Air Force Systems Command is sponsoring organization for the research.

Passenger List Full For Hawaii Tour

Northrop NRC Travel Club this week flashed the "sorry, full" sign for their annual yearend holiday excursion to Hawaii.

Ninety-four travelers have signed up for the tour departing December 24 and returning January 2. Only standby reservations are being accepted through Personnel Activities offices.

MONTHLY MILLION

Approximately $1 million per month is contributed to major health and welfare causes in Southern California through AID-United Givers. In AID's first year of operation, 1951, a total of $1,500,000 was raised for the entire year.

MILLION MILER

Jack Miller (right), executive pilot for Northrop Norair, receives congratulations from Max Stanley, chief of Flight Support Operations, upon receipt of Million-Miler Flying Safety Award. Honor recognized Mr. Miller's having flown 1,119,660 accident-free miles for Northrop and was presented by National Business Aircraft Association at recent Los Angeles meeting. Mr. Miller has flown for Northrop since 1954, has logged 6000 hours without an accident. His total time logged as a pilot is in excess of 15,000 hours.

SMALL BUSINESS CONFERENCE ON SUBCONTRACTING SCHEDULED

Northrop Corporation will participate in the first of a national series of small business conferences on subcontracting December 15 at the Beverly Hilton Hotel.

J. W. Hinchliffe, Corporate director of Materiel and Facilities, will moderate a question and answer panel during the conference. As a member of the Southern California steering committee for the conference, Earl Rossomme, Northrop Norair Small Business liaison officer, is in charge of publicizing the December 15 meeting.

Northrop's role occurs as members of the sponsoring organizations—the Aerospace Industries Association, the Electronics Industries Association, and the National Security Industrial Association.

The Small Business Administration, Department of Defense and National Aeronautics and Space Administration are participating on behalf of the government.

The Strategic Industries Association will offer the subcontractor viewpoint.

The purpose of the conference is to discuss ways and means of assuring greater subcontracting opportunities for small business and to define the procedures necessary to attain awards.

An attendance of more than 1000, representing small business from throughout the Southern California area, is anticipated.

Guest speaker will be the Honorable James C. Corman, Congressman from California, who will be introduced by Major General James Stewart (USAF Res.).

Other U.S. Government legislators have been invited to attend.

Philippines Is Host For Eleventh Asian Logistics Meeting

Four Northrop Norair executives were active participants in the Eleventh Asian MAP Logistics conference held November 10-13 at John Hay Air Base, Baguio, Philippines.

Others attending were: Frank Mathes, manager of Product Support; Richard W. Parks, deputy division manager, F-5 MAP; Donald H. Paap, director, F-5, Product Support (Pacific); and Donald D. Gregor, supervisor, Maintainability Requirements and Analysis branch.

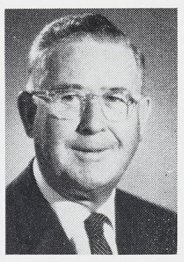
Mr. Mathes and Mr. Gregor made special presentations during the F-5 Component Repair seminar, a part of the conference.

More than 90 persons took part in the affair, including representatives from Air Force Headquarters, Logistic Command, Systems Command, Aeronautical Systems Division, Pacific Air Force, the office of the Commander-in-Chief-Pacific, and MAAG advisors from the Philippines, Republic of Korea, Nationalist China, Vietnam, Laos, Thailand, Burma and Japan.

FIRST PERSONNEL DIRECTOR

Walt Gage, Northrop Pioneer, Dies

A deep feeling of loss was felt at Northrop last month with the passing of Walter T. "Walt" Gage, a Northrop pioneer in every sense of the word and a close personal friend of many employees.



Mr. Gage

Mr. Gage, 73, died November 12. Funeral services were held November 16 at Santa Monica.

Walt Gage joined Northrop Corporation during its organizational phases in 1939. He was Northrop's first Personnel director. In the years following, he was in constant touch with many employees in his supervisory posts in Industrial Relations.

For a brief period he was in Industrial Engineering. Shortly after the formation of the Northrop Credit Union he took over as its secretary-treasurer, a post he filled for 17 years until his death.

Born in October 1892, in Tombstone, Arizona, Mr. Gage became a true aviation pioneer. During World War I he served with the 311th Aero Squadron as a sergeant first class. For nine years prior to joining Northrop, Mr. Gage worked with Douglas Aircraft in Personnel.

Mr. Gage is survived by his widow, Alice, and two sons, Carter and Walter H. Gage.

NORTHROP NEWS

Vol. 23 No. 21

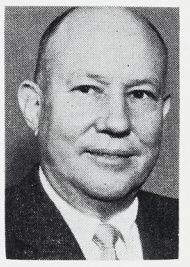
A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.

Telephone: CR 4-8061, BR 2-8581.

ORDNANCE GROUP ELECTS ALISON TO FOUR YEAR TERM

John R. Alison, vice president —Customer Relations, has been elected to a four-year term as a director of the American Ordnance Association.



Mr. Alison

The Association is a society of American citizens dedicated to industrial preparedness for the defense of the United States.

Mr. Alison, a fighter ace in World War II, is a past president and a past chairman of the board of the Air Force Association.

Prior to joining Northrop in 1953, he was president of the Transit Van Corporation of Redwood City, California, and before that he served as assistant secretary of commerce under Secretaries Harriman and Sawyer.

Northrop Pair Rides On 25,000 Mile Search for Comet

Frank Schroeder and Byron Bolling of Northrop Norair may not be around for the next performance, but they both have vivid memories of participating in what turned out to be one of the most spectacular astronomical shows of all time last month.

They took part in the flying laboratory observations (in the South Pacific) of the elusive comet, Ikeya-Seki.

Their lack of interest in the repeat show stems from the fact that it will be from 500 to 1000 years before the Ikeya-Seki comes back into range for such close observation again.

Under sponsorship of the National Aeronautics and Space Administration, the flying laboratory team of highly qualified scientists observed the comet over the South Pacific. They took photographs, made visual, infrared and spectrographic recordings and gathered wealths of infrared and radiometric data.

Operating out of Honolulu, Hawaii, the laboratory, housed in a specially-outfitted Convair 990 jet transport, made about nine flights, each of an average duration of from five to six hours.

Mr. Schroeder and Mr. Bolling were along to observe aircraft performance as part of a new aircraft maintenance contract Northrop is filling for NASA's Ames Research Center. Mr. Schroeder heads the Northrop staff there, while Mr. Bolling is a Quality Control representative.

"Each of us made a number of the flights and observed the comet when we could find a vacant window or porthole," Mr. Schroeder said. "It was really something to see and hard to describe. It was five times as brilliant as the full moon."

The two Northrop men returned to Ames RC late last month with the team and aircraft crew that had logged something like 25,000 miles in less than two weeks of operations and without a mechanical hitch.

Mr. Schroeder reported another interesting highlight to the trip. The Northrop men watched as a Vietnam-bound squadron of Northrop-built F-5s came in for a stop at Honolulu on one of their touchdowns on the ocean-spanning trip.

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills.

Classified

Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale

Camera, Argus C-3 w/shade, filters, leather case, $35. Buena Pk., LA 1-4711. A

Vacuum Cleaner, Kenmore, 7-mos-old, still under guarantee, $15. Hawthorne, 679-6917.

Refrigerator, Philco, 12 cu. ft., lge. freezer, auto. defrost, $100. Hawthorne, OS 9-2875. A

Yamaha, 1964 YDS2, 250 cc, semi-custom, $650. Wilmington, 830-1318, 834-4829. A

Corvette, 1963 fastback, r/h, p/windows, 340 hp, 4-spd. trans., $2700. Gardena, DA 9-3469.

Dodge, 1958 9-pass., full power, r/h, $200. Torrance, 320-2827. A

Night Stands, w/built-in radios, $3. ea. or sell sep. Burbank, PO 1-9565. A

Lounge chair, pr., beige textured fabric, foam cushions, button back, on casters, $40. Torrance, 323-6795. A

Bicycle, 26″, boy's, w/highrise handlebars, banana seat, $10. Hawthorne, OS 9-4778, 370-9238. A

Dodge Dart, 1962, 4-dr. sedan, p/s, p/b, 38,000 orig. miles, new brakes, $975. Reseda, 987-1352. A

Ford, 1951 custom 4-dr., r/h, good tires, new battery, elec. safety door locks, $125. Redondo Bch., FR 5-3914. A

Bicycle, 20″, girl's, $15. Downey, TO 1-6404.

Rambler Classic station wagon, 1963, V-8, auto. trans., w/w tires, r/h, $1495. Torrance, 326-6539. A

Bicycle, boy's 10-spd., Schwinn Continental, $40. Fullerton, LA 6-6759. A

Chevrolet, 1956 station wagon, 327, V-8 eng., 1-owner, new w/s/w Firestone tires, $400. P.V. Ests., 375-3902. A

VW Bumpers, front or rear, comp. w/guard, $12 ea. Huntington Bch., 714-897-8201. A

Buick Century, 1956 2-dr. Holiday coupe, full power, 6-way seats, recent o/haul, Offenhauser valve covers, $750. Hawthorne, OS 5-9500. A

Range, gas, 30″ Hardwick, auto. oven pilot & broiler, less than 2 yrs-old, $65. Wilmington, 835-2328. A

Oldsmobile, 1950 4-dr., needs brake work, $50. Anaheim, 714-772-9041. A

Vacuum Cleaner, General Electric, tank-type, attachments incl., $20. Hawthorne, 675-8360.

Transmission, for 1960 Sunbeam, w/overdrive, $35. Compton, NE 5-3294. A

Cabin Cruiser, 17′ w/trailer, twin 75 hp engs., 1 completely rebuilt, tachometers, 20-gal. gas tank, many other extras, sleeps 2-3, $2195. Torrance, 375-6634. A

Acreage, lake frontage in No. Calif., 2 2½-acre parcels, easy terms, 2 2½-acre parcels, $5750 par., 2 5-acre parcels, $9500 par. L.A., 476-1635. A

Corvair Spyder, 1964, 4-spd., 20,500 miles, r/h, rear speaker, $1595. L.A., PL 9-5991. A

Chevrolet Impala, 1958 2-dr. h/top, auto., p/s, p/b, w/s/w, r/h, $450. Hawthorne, 675-2953. A

Corvair Monza, 1963, 4-spd., other extras, 41,000 miles, $1245. Lomita, 326-8959. A

Bicycle, girl's, $15. P.V. Pen., FR 8-1863. A

Tape Recorder, Webcor Music Man, stereo, portable, $100. Redondo Bch., FR 2-1375. A

Ford Pickup, 1929 model A, good orig. running con., spare eng., radiator, trans. & various spare parts, $400. Thousand Oaks, 805-495-5531. A

House, 4-bdrm., family rm., 2½ baths, 1 acre, horses OK, near Northrop Ventura, $35,-000. Somis, 805-482-1186. A

Chevrolet, 1953 convt., stick shift & tonneau cover, many extras, $250. Torrance, 327-4585.

Piano, mahogany Wurlitzer spinet, traditional styling, $400. Manhattan Bch., 676-6249. A

Range, O'Keefe & Merritt, gas, w/timer, $40. Gardena, 327-2279. A

Landau T-Bird, 1963 full power, air cond., AM-FM transistor radio, custom wire wheels, 1-owner, $3300. P.V. Pen., FR 4-6664. A

Chevrolet, 1958, Del Rey, 2-dr., floor stick shift, $300. Redondo Bch., 374-2433. A

Buick Century, 1955, r/h, 2 new w/s/w tires, motor & body in good cond., $200. Fullerton, 525-1297. A

Dining Table, 38″x20″ console type opens to 90″, walnut finish, $45. Lomita, 547-2716. A

Range, Frigidaire elec., $50. Torrance, DA 6-1999. A

Corvair Monza Spyder, 1964 convt., 4 spd., r/h, $1300. Hollywood, OS 6-3475. A

Bookkeeping Machine, Burroughs sensimatic model 200, $100. Northrop Ventura Credit Union, ext. 420. A

Austin Healey Sprite, 1959, head rests, AM radio, $500. Hawthorne, 675-9540. A

Breakfast Nook, curved, w/40″ round table, incl. pedestal, approx. 4′x5′ sides, $20. San Pedro, TE 3-6814. A

Ice Skates, boy's black figure-type, size 5, $10. Canoga Pk., 346-5958. A

Ford, 1957 station wagon, V-8, $150. Hawthorne, 644-1785. A

Ski Boots, boy's dble. black, size 3, worn 10 times, $15. Norco, 735-1232. A

Unit, 32 deluxe, patio & pool, 1 & 2 bdrm., $360,000. Hawthorne, OR 0-7146. A

For Sale

Room Divider, black wrought iron, poles, shelves, & desk top shelf, $35. Brea, 714-529-1436. A

Pool Table, 8′ rack, balls & cues, $20. L.A., PL 4-0078. A

Train layout, HO elec., $35. Brea, 529-3531.

Tape Recorder, all-transistor battery operated, $10. Hawthorne, 676-0418. A

Ham Equipment, Viking adventurer transmitter, Hallicrafter S-40A RCVR, also Hallicrafters UHF communications rcvr., dipole antenna, $75. Torrance, FR 8-1350. A

Rifle, .30-06 Remington auto., 4-X Weaver scope, sling, butt plate & case, $100. Hawthorne, OS 6-1454. A

Bookcase, $10. Lawndale, 371-0194. A

Clothes Dryer, $25. Long Bch., 596-1280. A

Porta-Crib, wooden, $10. Rolling Hills, FR 5-8536. A

Volkswagen, 1961 radio, sunroof, $850. Hermosa Bch., FR 2-5367. A

Volvo, 1957, 1-owner, new brakes, battery, recent tuneup, 20-25 mpg, $325. Santa Monica, EX 9-5413. A

Guitar, Gretsch, Chet Atkins model, de luxe case & amplifier, $295. Hawthorne, 679-7474.

Ford Victoria, 1953 w/h/top, auto., p/s, new seat covers, $100. Inglewood, PL 4-1078.

Crib, Cosco, steel & nylon const., mattress, sheets, blankets & quilt, $25. Redondo Bch., FR 9-3134. A

MGA 1600 roadster, 1960 convt., r/h, new top, tonneau & tires, $900. L.A., 398-6630. A

Ford Falcon, 1960 2-dr. sedan, stick shift, r/h, $450. P. V. Ests., FR 5-0891. A

Rambler American, 1961, Custom, sedan, auto. trans., good tires, $550. Rolling Hills, FR 7-2355. A

Cabover Camper, 1965 Fleetaire, 10½′, butane refrig., 12 volt, 110 volt & butane lights, sleeps 4, hardwood ash inter., $1750. Long Bch., 429-4349. A

Train Set, Lionel, plus extra track, cars, & switches, $125. Hawthorne, OS 6-3886. A

Stove, Kenmore, gas, 4-burner, chrome top, glass oven door, griddle, broiler, storage drawer, $35. Inglewood, OR 3-1189. A

Telescope, 6″ reflecting-type w/equatorial mount, $99. Orange, 714-KE 2-1232. A

Pontiac, Grand Prix, 1962, auto. trans., r/h, p/s, p/b, new w/s/w, air conditioning, $1995. Lakeview Terrace, 896-3595. A

Ford, 1959, 4-dr. sedan, 6 cyl., stick shift, r/h, new headliner & front seat, $450. P. V. Ests., FR 8-5390. A

Ford Galaxie, 1961, 4-dr. sedan, auto. trans., p/s, p/b, orig. owner, $800. Rolling Hills, 831-9707. A

Ford, 1958, 4-dr., auto. trans., smog device, new battery, $275. Torrance, 371-8564. A

Bicycle, 20″ boy-girl convert., ball-bearings throughout, training wheels & V-room motor incld., $20, Torrance. FR 9-5690. A

Buick Special, 1957, auto. trans., p/s, p/b, $200. Hawthorne, OS 9-2710. A

Cemetery Lots, 2, dble. interment, Inglewood Park, El Portal sec., $1600. Garden Grove, 714-892-3552. A

House, 3-bdrm., den w/bar, 1¾ baths, outside rumpus rm. & workshop, dble. gar., lge. lot, $29,900. Inglewood, PL 4-6079. A

Yamaha 80, $200. Downey, TO 9-2673. A

Train Set, Lionel, 3 engines, 11 cars, 2 mechanized, 125 watt transformer, 3 bldgs., 1 tunnel, other misc. accessories, $45. Long Bch., GA 3-1363. A

Pots & Pans Set, Regal, stainless steel, never used, in orig. container, 3 ply 18-8, $25. Hawthorne, 676-6122. A

Oldsmobile, 1957 convt., full power, 48,000 miles, $450. No. Hollywood, PO 1-4103. A

Range, Kenmore, gas, 2-yrs-old, lge. oven, $60. El Segundo, 322-2191. A

Ford station wagon, 1959, air conditioning, r/h, auto. trans., p/s, p/b, w/s/w, other extras, $550. L.A., 474-3433. A

Bow, 35-lb. custom-made, laminated, fiberglass, $25. L.A., 645-1523. A

Acreage, 10 acres near Rosamond, $600 acre w/terms or $5000. Torrance, FR 8-1026. A

Enlarger, 35mm to 2¼″x4¼″, condenser & defusion, dustless neg. carrier, Marvel, $10. Hawthorne, OS 5-0606. A

Corvair Monza, 1963, 4-spd., bucket seats, other extras, $1245. Lomita, 326-8959. A

Club Chairs, set, custom-made, reversible cushions, 1-yr-old, $130 L.A., AX 4-5779. A

Corvair Monza, 1961, 4-spd., 35,000 miles, many extras, $795. Inglewood, 759-8920. A

House, 3-bdrm., 1½ baths, extra lge. living rm. & kitchen, h/wood floors, just painted inside & outside, new shrubs & blockwall, $22,000. Sepulveda, 894-0944. A

Ford Galaxie 500, 1962, 4-dr. h/top, 352 cu. in., 8 cyl., Cruise-o-matic, p/s, r/h, w/s/w, $1195. Rolling Hills Ests., 325-5875. A

Monza Coupe, 1965, auto. trans., all extras, $1950. Newbury Pk., 805-498-2529. A

Poodle, platinum, toy, male, 8-wks-old, shots, AKC, $90. P. V. Pen., 377-8817. A

Volkswagen, 1965, 2-dr. coupe, low mileage, r/h, $1725. Hermosa Bch., 372-5131. A

Workbench, 7′ long h/wood, drawers, fits DeWalt radial arm saw, $15. Sherman Oaks, ST 8-9709. A

For Sale

Ford, 1953, o/drive, r/h, $50. Torrance, FR 5-0946. A

Bar Stool set, swivel, for 36″ bar, oiled walnut legs, white Naugahyde seat & back, $35. Inglewood, OR 4-7743. A

Lots, 4, Holly sect., Green Hills Memorial Park, $1200. Lakewood, 429-6843. A

Shotgun, 12 ga., J. C. Higgins pump-type, model 20 deluxe, cleaning kit, vented rib, adj. choke & recoil pad, $55. Inglewood, 679-7667. A

Bed Set, 2 complete, double, $50. Torrance, 371-6686. A

Home, 4-bdrm., 3-yrs-old, landscaped, custom int. decor, G.I. resale, furn., $29,950; unfurn., $27,950. San Pedro, TE 3-6037. A

Wedding Bands, man's & lady's, matching, Florentine, white gold, can be resized, $100. Hawthorne, 676-1971. A

Pontiac Catalina, 1962, $1500. Lawndale, 371-5822. A

DeSoto, 1956, $75. Lawndale, 371-3991. A

Pickup, 1956 Ford ½-ton, s/trans., o/drive, heater, $450. Gardena, DA 9-3895. A

Corvette, 1962, 300 hp, 4-spd., new Good Year tires, tonneau cover, completely stock, $2450. Compton, NE 2-7635. A

Light Fixtures, 11″x16″ bubble Danish import, frosted glass, brushed brass, $10. San Pedro, TE 3-7306. A

Playpen & stroller, $15. Manhattan Bch., FR 6-9364. A

Oldsmobile, 1955 88, 2-dr. h/top, Hydro-matic, p/s, r/h, $150. No. Hollywood, TR 7-7251. A

Movie Camera, 8mm, Minolta zoom 8 w/light meter & light bar, w/Sekonic 80P projector, splicer & screen, $150. Gardena, DA 3-6759.

Bookcase Headboard, full-size, blond finish, $25. Gardena, DA 5-5245. A

Vacuum Cleaner, Eureka, 3-yrs.-old, $25. Inglewood, 671-9208. A

Wristwatch, men's, Omega Seamaster, gold auto. luminous & waterproof w/gold expansion band, $70. L.A. 836-3806. A

Studebaker, Lark 6, 1961, 4-dr. sed., r/h, stick shift, $425. Reseda, 342-9319. A

Race Car Set, Strombecker, $15. Torrance, 371-8939. A

Phonograph, portable, Magnavox stereo, $45. Chatsworth, 882-0761. A

Accordion, 120-bass cantino, w/case, $125. Redondo Bch., FR 5-4448. A

Cocktail Dress, marlin blue, floor length, size 12, worn once, $20. Gardena, 323-3245.

Flying Club, 172, no initiation fee, $25 mo., $6 per hr. wet. L.A., VE 7-9813. A

Range, O'Keefe & Merritt, gas, griddle, sep. broiler, shelf converts to cover range top, storage drwr., $40. Inglewood, 671-2170. A

Baby Furnishings, crib & chiffarobe, Whitney, maple, mattress, car bed, infant clothes, blankets, $50. Lennox, OR 2-2370. A

MG TD, 1953, $650. Lomita, 325-1407. A

Ford, 1957 6-cyl., stick shift, 4-dr., good tires, 1-owner, $125. Anaheim, JA 7-8124. A

Pickup & teardrop camper, Dodge, ½-ton, 1961, r/h, auto. trans., dual battery system, new 6-ply tires, intercom & radio to camper, camper is 8′ non-cabover-type, many extras, $1495. Torrance, 371-8701. A

Ford Pickup, 1954, ½-ton, $200. Torrance, TE 5-8608. A

Volkswagen, 1962, low mileage, $1000. Gardena, DA 9-4447. A

Sewing Machine, portable, White, $10. Manhattan Bch., FR 2-0720. A

Chevrolet Impala, 1961, 4-dr. h/top, p/s, p/b, $875. Torrance, 371-5697. A

Wanted to Buy

Snowshoes for small woman. Compton, NE 9-3825 before 3 p.m. B

Keys, unusual types for son's collection. Tarzana, 344-3644. B

Laundry Tub, single, & gas dryer. Hawthorne, OS 9-6982. B

Communications receiver that will cover 2-3 MC band, reasonable. L.A., 837-4596. B

Play House, child's, any size. Gardena, 635-3127. B

Freezer in working condition at reasonable price. Box 2101. B

For Trade

Plymouth Fury, 1964 h/top trade $900 equity for transportation car. Redondo Bch., FR 4-2915. C

FREE (To Be Given Away)

Floor Polisher, automatic. San Pedro. TE 1-3518. D

Rentals Offered

House, 1-bdrm., unfurn., trash paid, 220V elec., 3 miles from Northrop, $65. Torrance, 323-9586. E

Apt, 2-bdrm., unfurn., pvt. patio, closed gar., refer., hot water paid, soundproofed, $125 mo. Torrance, FR 5-0867. E

Apt, 1-bdrm, furn., heated pool, gar., coin-operated washers & dryer on ground floor, utilities incl., $125 mo. Hawthorne, OS 9-7123, 644-1700. E

Rentals Offered

Apt, 2-brm., 2-bath, walking distance of Northrop, $125. Hawthorne, 676-9620. E

Apt, 2-bdrm, unfurn., laundry, closed garage, walk to Northrop, $110 mo. Hawthorne, OS 5-3792. E

House, 1-bdrm, small furn., large encl. vegetable garden & yd., carport, tiled shower, rubbish removal & water pd., $80 mo. San Pedro, TE 3-2512. E

Apt, 1-bdrm., $85 mo. Gardena, 324-6277. E

Apt, 1-bdrm., furn., 2 miles from Northrop, $85. L.A., 295-9997. E

Apt, 1-bdrm., unfurn., gar., trash & water paid, 2 blocks from elem. school, 5 min. from Northrop, $79.50 mo., Gardena, DA 9-3436. E

Apt, 1-bdrm., furn., pvt. deck, lge. pool, sub. garage, near Northrop, $145 mo. Lawndale, 377-4372, 679-7426. E

House, 6-room, unfurn., 3-bdrm., 1¾ bath, fenced yd., lawn & water paid, near school & shopping, $130 mo. L.A., PL 4-1964. E

House, 2-bdrm., unfurn., fenced yard, close to Northrop, children OK, $105 mo. Harbor City, 325-5705 E

Apt, 2-bdrm., furn. & unfurn., all extras, close to schools, 10 min. to Nortronics PV, closed gar., encd. yard, soundproofed, $120-$135. Torrance, 375-9397. E

Personals

Wanted girl to share apt. in Manhattan Beach area, $67.50 mo. incl. utilities. Torrance, 379-2124. L

Driving to Chicago, Ill. Leave Dec. 22, return Dec. 28. Will take 4 riders round trip only. Box 2102. L

Will share driving or drive your car to New Orleans for gas. Leaving Dec. 18. Hermosa Bch., 379-9508. L

Thank You sincerely for your kindness, flowers & expressions of sympathy when my mother recently passed away. Special thanks to all my friends in Production Planning for their solicitude. RANDY WALLNER. L

I wish to express my sincere thanks for all the lovely gifts & cards during my recent illness. ISSY FREAS. L

My family & I would like to express our deep gratitude to our many Northrop friends for their thoughtfulness & consideration at the passing of our wife & mother, Gertrude Acord. C. W. ACORD & FAMILY. L

Going my way?

Going My Way forms, C66, are available from organization clerks. Mail GMW forms to Northrop News, 170, Beverly Hills. Deadline is noon Wednesday, one week before publication. GMW ads are run for one time only. If you wish the ad repeated, please fill out another form and forward to the News office.

Rides Wanted

7:30 a.m.—4:15 p.m.

Pasadena or Alhambra area, Alhambra. Adriana Franco, Norair, ext. 2667. 283-5415. 3

8 a.m. — 4:45 p.m.

Rosecrans & Studebaker Rd., Norwalk. T. A. Williams, Norair, ext. 1542, UN 8-2429. 5

Pacific Coast Hwy. & Hawthorne or Crenshaw Blvds., Torrance. R. A. Lawrence, Norair, ext. 1609, 1805, 326-7350. 5

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Manchester & Lincoln, L.A. Two days a week. John R. Chambers, Norair, ext. 616, 645-8611. 5

3:45 p.m. — 12:15 a.m.

More & Caswell or Wade & Caswell, L.A. Noe Castillo, Norair, ext. 527, 391-4237. 6

Prairie Ave. & 177th, Torrance. Grace L. Watson, Norair, ext. 1834, 370-2304. 6

7:20 a.m. — 4:05 p.m.

Prairie & 182nd, Torrance. Jane Grinnell, Mariposa, ext. 4035, DA 3-4209. 10

Rides Offered

8 a.m. — 4:45 p.m.

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

Universal Tickets Good Any Saturday

Northrop employees holding tickets to Universal Studios who were unable to attend a rescheduled all-Northrop day may still use those tickets for a tour of the motion picture—TV production center.

Universal Studios has advised NRC that tickets will be honored any Saturday for the remainder of this year.

Secretaries Plan To Form NSA Chapter in Conejo

A new chapter of the National Secretaries Association will be inaugurated in the Conejo Valley with an installation banquet scheduled for January 12 at the Los Robles Inn, Thousand Oaks.

Some 30 women from Northrop Ventura, North American Aviation Science Center and Purolator Products, Inc., learned about the new chapter, to be named the Los Robles Chapter, NSA, during a luncheon and orientation meeting in the Ventura cafeteria November 19.

Hostesses were Billie Linebarier, secretary to the controller, and Marjie Shaw, secretary to the director of Quality Control.

Information regarding membership may be obtained by calling Mrs. Linebarier at extension 366.

Symphonaires' Pace Quickens at Yearend

Northrop's Symphonaires, popular NRC-sponsored choral group, have launched their annual "busy season" with the coming of the yearend holiday period.

Included in their activities are appearances and performances at a variety of affairs. Initial 1965 yearend performance was December 3 at a meeting of the Norair Management Club at the Airport Marina Hotel.

On December 11 (7:30 p.m.) the Symphonaires will sing at the Calvary Presbyterian Church, 12515 Acacia. This will be followed by a December 14 (8 p.m.) show at the St. Francis Cabrini Catholic Church, Imperial and Normandie. On December 18 the group performs at the First Methodist Church, Spruce and Kelso, at 8 p.m.

December 21 (8 p.m.) will will find the Symphonaires appearing at the "Christmas Festival of Music" with the Centinela Valley Fine Arts Association at the Hawthorne Memorial Center.

The Symphonaires are under the direction of Paul Brizuela. David Pinto is the accompanist.

There's Still Time To Get Dance Tickets

Northrop's Christmas holiday dance comes off Saturday at the International Hotel and tickets are still available throughout Northrop facilities.

The affair begins at 9 p.m. in the International Room with Les Brown and his band providing music. Tickets sell for $2.10 per person and may be obtained from normal ticket outlets.

Northrop Recreation Clubs at Norair, Nortronics and Ventura are combining to sponsor the dance.

Southland Tourney Set for Bowlers

Keglers representing all Northrop facilities in Southern California swing into action Saturday and Sunday in the 12th annual Northrop Christmas Bowling Tournament.

The site is Tropicana Lanes in Inglewood. Squad times are 10 a.m., 12:30 and 3 p.m. both days. There will be men's and women's singles and doubles events as well as mixed doubles.

One hundred sixty individuals are entered.

ORDNANCE GROUP PROCEEDING WITH NEW TEST SITE

Northrop Nortronics is proceeding with plans to build an ordnance test site in the Glen Avon area five miles west of Riverside following approval last month of the Riverside County Planning Commission and the County Board of Supervisors.

Some 85 persons attended the two-hour hearing held at the Riverside County Courthouse November 15 at which the supervisors unanimously approved the conditional use permit. Most persons who protested this site were concerned primarily with the possibility of excessive noise that would be created in the hills north of Highway 60.

James Ricketts, deputy manager of Operations, spoke for Nortronics and explained the firings at the site would average only about two a day and be limited between the hours of 7 a.m. and 5 p.m., as set forth in the conditions of the permit.

Expenditures in excess of $250,000 in the first five years have been budgeted for the site, Mr. Ricketts said. Ten to twelve employees would be required at first, with an increase to 50 or 60 possible.

E. I. Hofmayer will be in charge of construction, which is scheduled to get under way this month.

Sailing Club Books Annual Dinner

Wise to the way of the winds, Northrop Sailing Club is taking no chances on holding its annual installation dinner—the Club has booked it tentatively for two places.

If the winds are fair, the installation comes off December 29 at Avalon climaxing a long cruise. But if small craft warnings fly, it will be held at the Lobster House, Redondo Beach.

Plans call for a rented cottage to serve as a focal point for those making the sail to Avalon. Contact either B. W. Agnew, ext. 1305, or B. B. Bowen, ext. 1883, both Norair, for information.

LONG SERVICE RECOGNIZED—Northrop Nortronics 25-year veterans were guests of honor at recent Management Club meeting along with their spouses. At right is Frieda Mooring, with Mr. Mooring, Northrop's first woman 25-year emblem winner. Others (from left) with their wives are Willard V. Gramm, E. C. Shafer, Otho L. Hudson and Niels Bertlesen. Standing alone is Frederick Stevens, Northrop vice president and Nortronics general manager, who presented emblems.

AWARDS: 25-Year Veterans, Spouses Hosted by Management Club, Stevens

(Continued from page 1)

training, home rule for the District of Columbia and various aspects of aid to education.

Mr. Smith spoke on industrial security and was especially informative in discussing the areas in which international espionage occurs.

Frederick Stevens, Northrop vice president and Nortronics general manager, presided at the presentation of 25-year service pins. He also spoke briefly on current Nortronics programs, sales outlooks and future potentials.

The six employees honored for their long service to Northrop were accompanied by their spouses.

Included among those honored was Frieda Mooring, an administrative assistant in Accounts Payable and Northrop's first woman to receive the coveted three-diamond 25-year emblem.

Willard V. "Bill" Gramm, an assistant foreman in Hawk assembly, was another long-time employee honored. Mr. Gramm began his Northrop career on October 1, 1940.

Niels Bertlesen, project group controller in the Technical Project Analysis section at Palos Verdes, was also honored. His service dates to October 7, 1940.

E. C. "Gene" Shafer, chief of Materiel Operations at Palos Verdes, was twice rewarded. In addition to his 25-year service emblem, Mr. Shafer was a winner of the club's attendance prize.

Otho L. Hudson, a structures assembler in the Hawk Assembly operations at Anaheim, received his 25-year emblem. Mr. Hudson joined Northrop on October 30, 1940.

Unable to attend the meeting, but recognized, was Herman C. Crawford, a manufacturing engineer in Manufacturing at Anaheim. Mr. Crawford is currently on medical leave.

Mr. Stevens congratulated each of the individual veterans and lauded their long and continued service to Northrop.

Joe Kalina Heads 1966 NRC Slate at Hawthorne, P.V.

Joe Kalina, president, heads a new group of officers elected November 13 by the Northrop Nortronics NRC Council at Hawthorne.

Also named to officer's posts were Dick Teel, vice president; Thelma Chambers, secretary; Bart Williams, treasurer; and Bob Marsh, sergeant-at-arms.

The officers, plus Earl Bird, outgoing president, also make up the Council's Executive committee. They guide the 25-member NRC group.

Installation of officers and NRC Council members will occur in January at a special joint dinner with the NRC Council at Nortronics Anaheim.

Mr. Kalina served the Council at Hawthorne over the past year as vice president. Mr. Teel heads the popular golf activity. Thelma Chambers has served over the past year as NRC secretary. Mr. Williams was softball commissioner and Special Events chairman, while Mr. Marsh has served previously as an NRC representative-at-large.

Skoshi Tiger Isn't Paper, VC Discover

The squadron of Northrop-built F-5's assigned to Vietnam for combat evaluation is "making life miserable for the Communist Viet Cong," according to an official news release by the Tactical Air Command Office of Information, Langley Air Force Base, Virginia.

The release was based on dispatches from the 2nd Air Division at Bien Hoa Air Base in Vietnam and is reprinted here verbatim:

Viet Cong insurgents, blasted by a flight of F-5As six hours after they flew in from the United States last month, have been afforded no rest from their deadly sting.

In a single strike last week, three F-5A pilots from the 4503rd Tactical Fighter Wing destroyed 39 Viet Cong buildings and recorded five secondary explosions. The action took place at a VC concentration and storage area 40 miles east of Bien Hoa.

A member of the flight, Colonel Frank M. Emory, 47, of Seattle, Washington, commander of the 4503rd, said, "We had a good target and we made the most of it. We saw no ground activity nor did we experience ground fire."

With Colonel Emory on the flight were Major Aubrey C. Edinburgh, 37, of McAdoo, Texas, and Captain Samuel T. Gore, 32, of Houston, Mississippi. This was Colonel Emory's 21st mission against the Viet Cong while Major Edinburgh racked up number 25. Captain Gore has 22 missions.

Freedom Fighter pilots, all TAC veterans, trained for the test program at Williams AFB, Arizona. They logged more than 1000 hours in the aircraft before taking it to Vietnam for the evaluation.

Underwater Study Won by Northrop

Working under a contract exceeding $1 million, Northrop Ventura is developing an electronic system to improve anti-submarine warfare techniques.

An Interim ASCAC or Anti-Submarine Classification Analysis Center system will be designed and developed under direction of the Naval Air Development Center, Johnsville, Pennsylvania.

"This contract is the first step in what we hope will be a growing new field of endeavor at Northrop Ventura," said George F. Douglas, Northrop vice president and Ventura general manager. "We are aiming a great deal of effort toward development of both ASW information systems and unmanned underwater vehicle systems."

The purpose of the Anti-Submarine Analysis Center is to provide rapid, accurate identification of contacts made by anti-submarine surveillance units.

ASCAC would be located on shore or shipboard and would coordinate data received from a number of sensing points. Trained personnel would be provided with the necessary "tools" and environment with which to interpret the information more accurately and rapidly than is presently possible.

BOTTLES: Munday's Ship Shape Pad

(Continued from page 1)

dow putty becomes the water. All parts are completed, then painted, outside the bottle.

After all parts are made to his liking, Joe goes through a "dry run"—putting the ship together inside the bottle without cementing items in place. Only when everything fits perfectly will he begin the final step.

"Once I start assembling the finished item inside the bottle I can not stop for anything," Joe says. "For about three hours I ignore the telephone, knocks at the door, itching nose, everything. I can not stop until I am finished."

Colored window putty anchored to the bottom of the bottle and the hull anchored to the putty forms the only contact point between the model and bottle.

Joe uses a regular form of industrial packaging, along with reams of cut newspaper to package his creations for shipment. Although he has shipped to New York and Florida, he has never had a bottle broken en route.

The information Joe has collected on sailing ships is almost as fascinating to him as the models he builds.

"I found that in the California gold rush days a man could build a boat on the East Coast and book enough passengers on the first trip around Cape Horn to pay for the boat," Joe said. "The average passage cost $1000 then."

Another interesting discovery was that West Coast shipbuilders would go into the north woods, fell timber and cut up boards. They would move the lumber to the coast and actually build ships right on the beaches.

Over his apartment workbench Joe has mounted a big sign that sums up bottled shipbuilding nicely.

It says: "DO NOT HURRY."

JOE MUNDAY WITH BOTTLE SHOP PRODUCTS.

Torrance Students Visit Palos Verdes

Thirty-five students from South High School, Torrance, got a look at post-educational electronics recently in a tour of Nortronics Research Park at Palos Verdes.

Guided by their teacher in Electronics 1 and Electronics 2 classes, Warren Cross, the students were met by George Richards, supervisor of Personnel Administration at Palos Verdes, and were introduced to Nortronics capabilities by Dan Dennis, chief of the Inertial Systems Development group.

The youngsters were taken through the clean room area by Ross Rogers, Engineering Project Development representative, who showed examples of the hardware that must develop from any successful electronics research program.

A tour of the Nortronics observatory was guided by Norm Laverty, chief of the Advanced Tracking Techniques group, assisted by Mike Kerpchar, project engineer; Dwight Hawley, supervisor and Jim Lowe, senior engineer, of the Astrotracker Development group.

NORTHROP NEWS

Holiday Greetings

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 23, No. 22 December 22, 1965

Gemini Chutes Recovered; Schirra 'Wants One for Wall'

Among the many new space records established during the historic flights of Gemini 6 and 7, which ended December 18, was the first successful operation of two landing systems within a four-day period.

Also for the first time, part of the Northrop Ventura parachutes were recovered from the ocean for examination and analysis. All parachutes, along with the rendezvous canister, were recovered after the landing of Gemini 6.

"I hope they recovered that parachute," commented Command Pilot Walter Schirra, after he was aboard the carrier, USS Wasp. "I want to hang it up in my den."

Paul Haney, NASA public affairs officer, stated that "recovery of the parachutes is important to determine if there is any degradation of materials during prolonged exposure to the space environment."

Following the flights, Dr. Robert Gilruth, director of NASA's Manned Spacecraft Center, said, "I was tremendously impressed by everyone involved in re-entry and recovery."

Northrop Ventura landing systems developed for both Gemini and Apollo were prepared for a third operation within the same week. The third, however, was called off by postponement of the Apollo mission abort test which had been scheduled for Saturday, December 18, at the White Sands Missile Range.

Gemini 7 Launch Tracked by ALOTS

Northrop Nortronics' Airborne Lightweight Optical Tracking System (ALOTS) was successfully tested during the launch of Gemini 7 spacecraft December 4.

Flying in a KC-135 aircraft at 41,500 feet, ALOTS acquired the Titan II booster as it broke through dense cloud cover above Kennedy Space Center. The system automatically traced the flight until the first stage Titan separated at about 100 miles altitude.

This was the first time Gemini staging was recorded visually.

REPUBLIC OF CHINA RECEIVES INITIAL FIGHTER SHIPMENT

Delivery of the first squadron of Northrop F-5 supersonic fighters to the Republic of China was held December 9 at Tainan Air Base, Taiwan. Major General Dwight B. Johnson, chief of MAAG to the Republic of China, turned over the supersonic jet fighters in a mid-morning ceremony to General Hsu Huan Sheng, commander-in-chief of the Chinese Air Force.

The Republic of China is the fifth of nine allied air forces to receive the F-5 for modernization of its air arm. The U.S. Defense Department has placed orders with Northrop Corporation for approximately 700 F-5 fighters. Twelve F-5s are currently in Vietnam with the U.S. Air Force Second Air Division for combat evaluation.

Participating in the Taiwan ceremony were senior officers of Chinese Air Force headquarters and MAAG officials. Northrop representatives included R. R. Miller, D. D. Darnell, jr., and T. L. McCarthy.

Aeronautical Group Headed by Barber

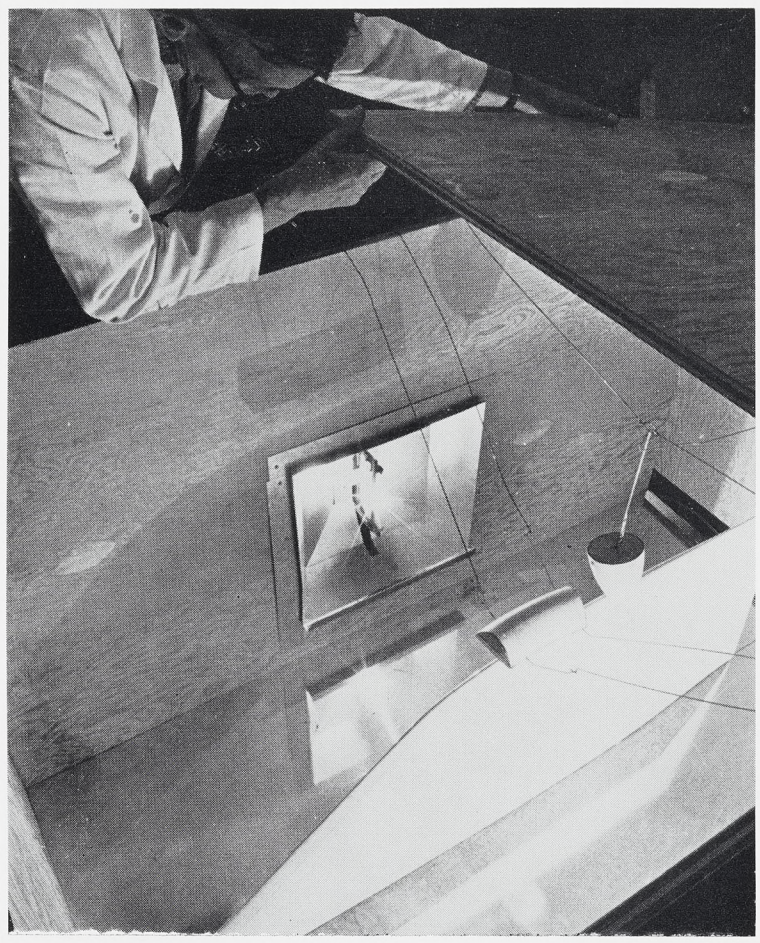
Appointment of H. W. Barber as chief of the Aeronautical Engineering group at Northrop Ventura has been announced by C. E. Weinert, director, Design and Test Engineering section.

Mr. Barber has been at Northrop for 10 years. His responsibilities have been in the areas of mechanical and structural design, system integration and mechanical systems field development and evaluation.

Dividend Declared

The Northrop board of directors has declared a quarterly dividend of 25 cents per share, payable December 11 to shareholders of record November 26.

STRANGE ENVIRONMENT



Environmental acceptance testing of plastic parts developed by Northrop Ventura for a U.S. aircraft manufacturer includes exposure to ultraviolet radiation from twin carbon arcs. Ed Worrell, Research and Development technician closes cover of chamber prior to test of fin and two small radomes for a jet fighter. Wires across compartment hold items in place.

$10,000 SAVED IN HOLIDAY DRIVE BY SUGGESTION AWARD PROGRAM

With more than 125 cost improvement ideas submitted, Northrop Ventura garnered a $10,000 saving in a pre-Thanksgiving employees suggestion award program.

Twenty-four suggesters received cash awards and turkeys and an

Photo on page 3

additional 35 got turkeys, all in time to consume the birds on Thanksgiving Day.

The top monetary prize was $390 to Francis L. Hicks of the Maintenance department for his suggestion reducing the operating costs of the air conditioning system. A manual control switching device now permits reduced electrical power consumption during minimum load periods about 12 hours each day.

Jack L. Landis of the Electronic Fabrication group earned $120 for his idea in improving fabrication methods for parachutes. He suggested heat basting of seams instead of hand tacking or gluing.

Sixty dollars went to Sarah E. Hudgins, Records and Release branch, for her idea that two duplicating machines be placed on separate electrical circuits.

Winners of $30 awards were Robert Dykes and Josephine Orefice.

Twenty dollar awards went to Grady Means and B. H. Webster.

Recipientes of $15 each were Alexander Blackwood, William Cope, Flo Johnson, Gerald Siebers, Ray Uribe and Steve Wrubel.

Ten dollar winners were C. W. Atkins, John Baker, James Bamburg, Les Bradley, A. P. Douglas, S. M. DiPasquale, Lloyd Eastman, Joan Garfield, Helen Palenko, Mel Pierceall and Marvin Shered.

VENTURANS LEND HAND TO SCHOOL FOR HANDICAPPED

Northrop Ventura employees looking for a worthwhile Christmas donation recipient can turn to the Conejo School for Child Development in Thousand Oaks.

The school for neurologically handicapped, brain-injured and emotionally disturbed children opened its doors in March 1965. The unpaid head of the school is Mrs. Francis Hicks, who had worked for Northrop Ventura's Accounting department in Van Nuys as Mrs. Mary Volpe.

The only financial support for the school comes from donations, since mentally handicapped children receive no state or federal aid until they are eight years old.

Venturans have already begun giving to the school; for example, a typewriter has been provided by Bernard W. Montag, jr., controller, and three tricycles and a record player by members of the PBX department; Corinne Samuelson, Laura Stump, Gloria Correy and Verni Bloom.

The school can use such things as desks and playground equipment, or volunteer services.

Donations are tax deductible and may be volunteered through Billie Linebarier, Room 200, Administration building; Tamara Tracy, Room E-123; Margie Shaw, Room M-1101; Eileen Munro, Room M-1125; or Chili Daly, Room A-139.

Golfers at Knollwood For Final '65 Match

Northrop Ventura Golf Club will return to Knollwood Golf Course next Wednesday for the 1965 closer after being rained out at the Granada Hills course November 26.

The Knollwood event is the second half of a yearend double header that found the divot diggers traveling to Ojai December 11. Ojai is a favorite of the Venturans, who take on the tricky 18 holes at the country club a half dozen times each year.

At Knollwood they'll be up against a hilly, tough course that not only taxes a golfer's capabilities, but his legs as well.

COMPUTER BYPRODUCT FINDS USE IN JUNIOR ACHIEVEMENT WREATH

A by-product of the computer age has joined forces with the Christmas spirit to provide a product line for a Junior Achievement firm operated by Thousand Oaks High School students.

In keeping with the season, the junior achievers are manufacturing and selling decorative Christmas wreaths. The chief ingredient consists of used IBM cards for the

Photo on page 5

computers at Northrop Ventura, the Conejo Valley company which for the third consecutive year is counseling Ventura County's only Junior Achievement organization.

Under guidance of Northrop counselors, the company was formed by 19 students shortly after beginning of the current school term. Its name is Conejo Achievers Company with the abbreviated trade name CONACO.

Meeting each Monday night at the Thousand Oaks Community Center, the youngsters issued and sold stock, chose their product line, and now are busy manufacturing and selling the wreaths at a price of $2 each.

Among the 19 students learning the American free enterprise system through first-hand experience is Seree (Jim) Damrongshat, a senior going to school in Thousand Oaks this year from Thailand.

Navy to Evaluate Voice Alert Unit

An advanced version of the voice warning system which alerts Air Force B-58 bomber crews to emergency conditions during flight will soon be evaluated for application to Navy aircraft.

The Nortronics Division of Northrop Corporation will provide 34 of its Mark I voice warning reproducer sets to the Navy Bureau of Weapons for flight testing aboard Navy P-3s, F-4s and A-5s. The voice-alert units will augment present in-flight monitoring systems, such as instrument panel warning lights. The taped messages will be varied in order to determine specific aircraft requirements.

Through a network of remote fault sensors, the Mark I will directly monitor airframe condition and aircraft system status.

BEST WISHES

To all Northrop Personnel:

Mrs. Jones and I extend to you and your families our warmest greetings for the Christmas holidays and our best wishes for a Happy New Year.

This year our fellow employees are observing Christmas in Allied countries around the world as well as across the United States. Whether it be Bonne Noel, Feliz Navidad, Froliche Weichnachten, Buon Natale, or the more familiar Merry Christmas, I wish to convey to everyone my hopes for a joyous holiday and my sincere appreciation for the continuing effort which makes it possible for us to start each new year full of anticipation for individual and company advancement.

Thomas V. Jones
President and Chairman

To Northrop Ventura Personnel:

Mrs. Douglas and I extend our sincerest wish that you and your families will have a warm and joyous Christmas, and a New Year of prosperity and happiness.

Especially I thank all of you for the effort and loyalty devoted to our division and its programs during 1965. Only through such work and loyalty will we be able to maintain our position within the highly-competitive aerospace industry.

I am confident that, with your continued help, 1966 will be a year of new growth and opportunity.

George F. Douglas
Corporate Vice President and
Northrop Ventura General Manager

Fortnight in Review

Golfers who won in Nortronics Twilight League (photo below) at Los Verdes and Alondra golf courses line up with trophies received earlier this month at Palos Verdes. They are, from left, John P. Overholser, Ted Deguisne, Gerald Duket, George Chalmers, Jack Koletty and Dave Lipscomb. Missing from presentation were winners Bill Mahlman, Ed Kong, Bob Harrod and Fred Woods. In photo at right, Dr. Donald A. Hicks, vice president and manager of Nortronics Applied Research department at Newbury Park, presents 15-year service pin to Helen Kramb, administrative secretary to the controller and director of Administration.

Barry Riley Studies Democracy In Africa on Somali Assignment

Barry Riley is in eastern Africa for a year, representing the National Geographic Society and Shell Oil Company and writing a book which will also serve as his Ph.D. thesis.

Barry, son of Len Riley, who is head of Purchasing, Material Proposals and Advanced Planning at Palos Verdes, will write his thesis on the Somali Republic government. He has already completed the academic requirements for his doctorate at Johns Hopkins University, Washington, D.C.

The younger Riley is in Mogadishu, capital of the small country with what is reputed to be one of the most democratic governments in the world. The capital city is a seaport on the Indian Ocean with a population of 90,000.

Barry received his M.A. in international law and diplomacy from Stanford University. His sponsorship by Shell and the National Geographic Society was based on scholastic excellence.

He will submit his thesis not only to the School of Advanced International Studies at Johns Hopkins toward obtaining his doctorate, but to Shell Oil, which is providing a $5000 National Science Foundation Fellowship award for completion of the book.

A collection of camera equipment recommended by National Geographic will help Barry get pictures up to the internationally famous standards of that organization.

Like his father, holder of more than one tennis doubles trophy, Barry is an athlete. He was offered a track scholarship to Stanford as well as the scholastic one he accepted. While at Stanford he made the freshman track team in the high jump and pole vaulting, but injured his back and dropped out of competition.

Before returning to Southern California, Barry will spend five or six months on tour around the world.

Conejo NSA Group Meets New Officers

A pre-charter get-acquainted dinner brought together members of the Los Robles Chapter, National Secretaries Association, at Conejo Lodge in Thousand Oaks, December 14.

During the meeting, the officers, who will be installed January 12, were introduced. Each charter member, also, was asked to introduce herself and deliver a brief sketch on her background.

The new Los Robles Chapter includes secretaries from firms in the Newbury Park industrial park.

The officers are Sylvia Savage, North American Aviation Science Center, president; Billie Linebarier, Northrop Ventura, first vice president (membership); Frances Jewitt, NAA Science Center, second vice president (programs); Marian Morioka, Purolator Products, Inc., secretary; and Jodi Letts, Packard Bell Electronics, treasurer.

Rockhound Movie

The Northrop Ventura Rockhound Club will show "The Secret Desert," a motion picture about ghost towns, lost mines, jagged mountain peaks and twisted canyons on January 14.

MED DELIVERS MARINE CONTROL SYSTEM TO SUN

The first of six marine control systems, developed by Northrop Nortronics to centralize previously scattered engine room instrumentation and controls, has been delivered to the Sun Shipbuilding and Drydock Company, Chester, Pennsylvania, for installation aboard the SS Santa Lucia.

The centralized control system, built by Nortronics' Marine Equipment Department, Needham, Massachusetts, will permit two men to monitor and operate turbines, boilers and other equipment which currently require large engine room crews. The system will also permit direct control of the main engine from the bridge.

In an emergency, one man can accomplish all the engine room tasks required to operate the ship.

The SS Santa Lucia is the first of a new class of cargo ships, designed by naval architects Gibbs & Cox, being built for Grace Line by Sun.

All told, more than 50 operations will be accomplished simply by pushing buttons on the engine room control console. In addition, 100 points in the engine room will be continuously monitored with alarms provided for abnormal temperatures, pressures and liquid levels.

An automatic bell logger will record information such as propeller speed, throttle commands, and time of day—information which previously was hand recorded.

Bassett Space Walk Holds Special Interest at Ventura

Captain Charles A. Bassett II, the astronaut who won the support and friendship of Northrop Venturans on a plant visit last May, has been named to take America's second walk in space.

NASA announced last month that Astronaut Bassett will be copilot for Gemini 9 flight, tentatively scheduled for July of next year. Elliot M. See, jr., a civilian astronaut, will be command pilot.

Plans call for Astronaut Bassett to remain outside the Gemini capsule for at least one complete trip around the earth while anchored to his ship with a 200-foot lifeline. He will be the first to wear a self-propelled maneuvering unit on his back.

Astronaut Bassett visited the Ventura plant May 3, at which time he addressed a gathering of all employees and was principal speaker at a Management Club meeting.

During his talks he praised the soft landings which all astronauts to date have experienced with parachute landing systems developed and manufactured by the Division.

Mr. See and Captain Bassett also will attempt again to rendezvous with an unmanned Agena satellite put into orbit ahead of them. This was the mission of Gemini 6 October 25 which never got off the ground when the Agena exploded after launch.

The actual docking experiment, which is vital to plans for returning Apollo astronauts safely to earth after their landing on the moon, has been assigned to Gemini 9.

NORTHROP NEWS

Vol. 23 No. 22

A Northrop Corporation Publication
9744 Wilshire Blvd., Beverly Hills, Calif.
Published every other Wednesday

Permission to publish material with credit to Northrop News will be granted.
Telephone: CR 4-8061, BR 2-8581.

Betty Tarquinio Services Held

By ROLAND HARVEY
Northrop Ventura Timekeeper

A profound sense of loss was experienced among the many friends of Betty Tarquinio, who passed away November 22.

Following Rosary November 26, funeral services were held at St. Paschal Baylon Catholic Church, November 27 in Thousand Oaks.

Mrs. Tarquinio

Born February 1, 1927, Betty joined Northrop Ventura May 1, 1956 as a combination switchboard and teletype operator and was made senior TWX girl in June 1957. She performed her duties for almost a decade in her own inimitable, cheerful, smiling way up to October 5, when she was hospitalized.

Betty is survived by her husband Joseph and her mother, Florence Warren.

Acquiescing to what, we are sure, would have been her wish, we would like to reprint an old but fitting poem as an expression of our sorrow:

"You never miss the water until the well runs dry, you never miss the sunshine until it leaves the evening sky, you never miss the summer until the snow begins to fall, and you never miss the ones you love, until they've gone beyond recall."

Winners of three top awards for employee cost reduction suggestions at Northrop Ventura (left photo) receive their checks from Ken Geller. Recipients are (from left) Jack Landis, $120 award; Sarah Hudgins, $60; and Francis Hicks, $390. Approximately $10,000 in division savings was accomplished by incentive program during Thanksgiving period. New Northrop Ventura Management Club officers (photo above) who were introduced to membership at annual banquet and dance December 4 are (from left): Bill Young, Ron Waters, Charles Olmstead, Don Archer, and seated in front is Eileen Munro.

Christmas Spirit Has No Season

By WILLIAM LARRABEE
Vice President—Industrial Relations

Most of us think of Christmas as the season for the giving of gifts to our families and friends. At Northrop, however, we have a tremendous number of people who pack a little bit of the spirit of Christmas giving into their daily lives. They do this without fanfare and without seeking or receiving any recognition other than the satisfaction of helping others. They give not only of money but also of themselves and of their time in all kinds of charitable and civic activity.

One of the best examples of what Northrop people can do when they set about it is our "Adopted Family" program. Some 11 years ago a group in Manufacturing at what is now Norair recognized that every one of us has a run of misfortune at one time or another and that Christmas could be pretty bleak unless something were done about it.

Mr. Brazil

They decided that they would see to it that some families had a Christmas which just couldn't be there otherwise, and they "adopted" three such families. I talked to Tom Brazil who has been in the program since the start. He told me how word of what had been done spread within the company and how the plan grew throughout the years. This year 71 families are being "adopted" and each of these families will have a real Christmas. Marie Tully at Norair and Verda Campbell at Nortronics, who work so hard on this program, could tell you of the joy which has been brought into Northrop homes because a small group of people followed through with an idea 11 years ago.

All of us know about the Red Cross and its blood bank programs. About 10 years ago, a few devoted people started working with the Red Cross in a small way to build up a Northrop blood bank account. The net result is that almost 20,000 pints of blood have been made available to Northrop people and their families to help when illness struck. All of us are grateful to people like Mrs. Mary Jo Horn, who, according to our records, is our champion donor.

Mrs. Horn

Our NORAID program was started 10 years ago by a small group of men who thought that there should be a means whereby contributions could be made by all of our people as a group of charitable causes and the least fortunate among us could be helped by donations from the rest of us. The company offered to handle payroll deductions. George Gore has been with the program from its inception and for the past eight years has been chairman of the NORAID board. He tells me that since it was started, NORAID has distributed over $500,000 in direct grants without strings attached to fellow Northrop people in need.

Mr. Gore

Anyone who has not attended the annual Children's Christmas party at Hawthorne has missed a real treat. Somewhere around 4000 children of Northrop employees head for the North Pole which is complete with Santa Claus, Santa's helpers and a whole group of Northrop Recreation Club volunteers who get as much enjoyment out of it as the children. Similar get-togethers for the youngsters are held at other Northrop facilities.

There simply isn't room in this issue to talk about all of the other things which our people do. Among the charities, we would have to tell about the Conejo School for Child Development supported by our Ventura Division personnel. We would have to discuss Junior Achievement programs, Scout activities, Chamber of Commerce and PTA work, the YMCA, and many more. We can truthfully say as we enter upon our Christmas holiday that we have every right to be proud of being associated with men and women who contribute so much to their communities and the well being of others.

Festive decorations add to spirit of season at hand throughout Northrop. Verda Campbell (above) adjusts Nortronics Anaheim tree. Charlotte Skipper (below) bedecks Palos Verdes rubber tree.

Photos by: Val Hawes, Nortronics; Ron McGaffin, Norair; Chuck Ramsey and Bob Steingart, Northrop News; Bob Thornton, Ventura; and Ike Murata, Norair.

NRC Symphonaires lift their voices in traditional airs of the season for members of the Northrop Norair Management Club. Group, composed of representatives from several facilities, is under the able direction of Paul Brizuela.

Carol Finds Joy Helping 80 Orphans

Carol DePauw can celebrate Christmas this year with the true joy of one who has given to those less fortunate.

Miss DePauw

A dozen or more of Carol's weekends this year were spent in La Mission, Mexico, washing, sewing and ironing for 80 children at the Open Door of Faith Orphanage. Last weekend she took time out from women's work to help install plumbing in a new dormitory for the parentless Mexican children.

Carol, a secretary in the Research Design branch at Norair, belongs to a group of single American men and women who are working to better the lot of the orphans.

The members of this nameless organization took with them last Saturday and Sunday a pinata and all the festive homemade goodies necessary for a Christmas party.

They helped Papa and Mama Freeze, the American couple who run the orphanage, take care of the children. They handled the arrangements for the party.

Carol says the dormitory project is particularly important, since the one in use now is overcrowded beyond all rules of safety.

"We can use all the help we can get," she said, "to finish the new building. We'd also like to get some shoes and socks for the children, to help keep them warm this winter."

Carol specified shoe sizes for children from infants to 15 years, and white stretch socks that can be worn without regard to matching pairs. Flannel sheet blankets are another needed item.

They can be sent to her at her home, 3605 Palos Verdes Drive North, Palos Verdes Estates, California.

IN THE INTE

Highlight of the pre-Christmas social whirl is traditionally an all-Northrop dance sponsored by combined NRC Councils. Scenes here were snapped at International Hotel December 11 when employees from all divisions and their guests enjoyed fun-filled evening, including dancing to music of the Les Brown Band.

Christmas Now Comes

Christmas comes in July, too.

At least it has for personnel in Northrop Norair's Manufacturing Research and Development group since Nguyen Manh Bao came into their lives five years ago.

Nguyen Manh Bao, or simply Bao, is an appealing, lovable and sensitive little resident of South Vietnam who considers each individual in the group as his "special" foster parent.

Manufacturing R&D employees return this feeling many times and regard Bao as another son. Thus, everyone joins in enthusiastically in July when gifts must be obtained and shipped to assure their arrival overseas by Christmas. Then in December funds are raised to support Bao for another year and at the same time, the group "adopts" a needy local family for Christmas.

One of the leaders in the Bao project, Paul Warren, explains how it got started:

"In 1961 we reasoned the exchange of Christmas cards was redundant and the money saved, plus a little more, could be put to a better use. We looked into several ideas and decided to support the Foster Parent's plan on a one-year trial basis. Through it we met Bao and lost our hearts."

Participation is strictly voluntary. Most of the 35 employees give on a sliding scale based on salary. The average donation is between $8 and $10 each per year.

The total is ample to pay the basic cost of $180 per year and provides a surplus for gifts at Christmas, birthdays and other special occasions.

The basic fee assures Bao and his family of a cash allotment each month, special food and clothing parcels, additional rations of staples, sanitation and personal hygiene items, medical attention and a rare opportunity for schooling. It provides help for the entire family.

Bao's parents came to South Vietnam from the north in 1954 to escape the Communists. There are now three brothers and his parents. His father earned 41 cents per day as a barber until tuberculosis forced him to quit work. The mother is now the sole breadwinner, earning 13 cents daily selling rice cakes.

The first Nguyen home near Saigon was a simple one-room

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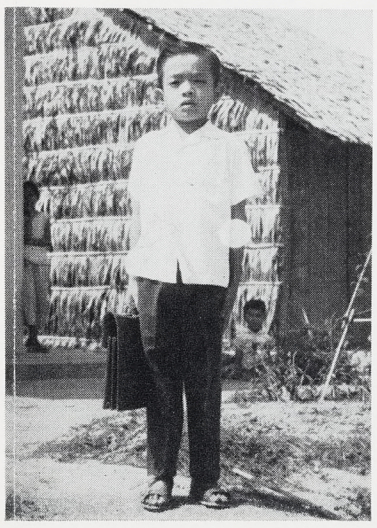
lun- Informed of the disaster and yees the fact the family was living in on a tent, the Norair group collected n is a special fund of $150. It helped ear. the family build a new and larger the home of concrete and brick with and a metal roof and also their first s at kitchen. It also helped the family ther pay outstanding debts.

One of the requirements of the and Foster Parent's plan is the month- nent ly exchange of letters between and



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foster parents and the child. These have given the Norair group a vivid picture of life in a war-torn nation.

Bao, through a case worker, writes of many things. He tells his parents of his schooling (he ranks fifth in a class of 75) and of special holidays and excursions. He is fond of animals and growing things. He likes photographs and colored post cards and especially magazines and periodicals.

He tells how he and his schoolmates "sing unanimously," "do gymnastics" and how he "studies hard to be able to succeed rapidly." He begins each letter with a polite query as to the health of each of his parents. He is very careful to list each item he has received. And he frequently tells of sharing his gifts and toys with others.

Norair parents, in turn, tell Bao of their own families, their day-to-day activities and places and things of interest to him. The letter writing is shared by all the group.

There is never a doubt that Bao, who is just 10 years old,

(See FOSTER CHILD, page 6)

Change of Pace in Store for Many As 10-day Yearend Holiday Begins

As normal work shifts end tomorrow, thousands of Northrop employees on the West Coast will lay down their tools, silence their machines, lock up their desks, exchange last-minute greetings, and depart to join their families on a 10-calendar-day yearend holiday.

Throughout Northrop the exodus will be general and complete.

Only token security, maintenance and services personnel are expected to maintain lonely vigils until work resumes January 3.

Personnel normally manning medical, insurance, cafeteria, transportation, mail and other services will also be on holiday so their functions will be closed. And except for a few isolated recreational events scheduled, all personnel activities will also close.

The latter will include some 100 people who will wing their way westward toward a Hawaiian Christmas under the auspices of the combined NRC Travel Clubs.

Sailing Club members will hoist their sails and head for a December 29 installation dinner at Catalina Island. Golfers will iron out the kinks with a two-day (December 27-28) tournament over two courses.

Ski Club members will take advantage of abundant snow at higher elevations with a trip to Mammoth Mountain. And the rockhounds will head eastward toward their favorite desert assembly points.

But for the majority of Northrop families the period ahead promises a welcome change of pace. They plan to slow down and relax.

Over the past few weeks the traditional yearend slate of events have carried employees and their families at an ever-quickening pace.

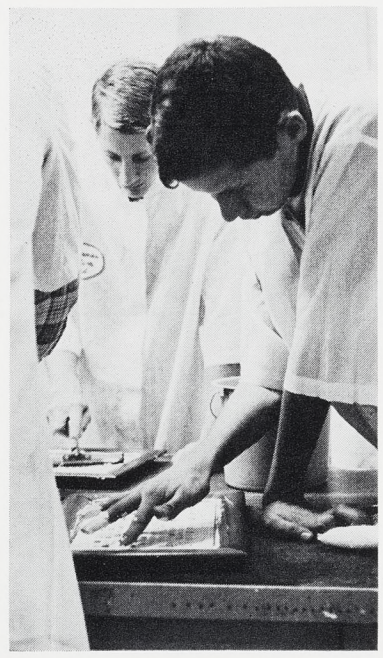
Augmenting informal get-togethers have been all-Northrop events such as the Christmas dance held at the International Hotel December 11 and a bowling tournament December 11-12. They helped to bring together old friends from many divisions and facilities.

Too, there have been the annual round of NRC-sponsored events, including some special ones in which Northrop youngsters were kings. Over the past weekend kids' parties were scheduled at Hawthorne, Anaheim, Palmdale, Huntsville, Alabama, and Kennedy Space Center, Florida.

Northrop parents took part, of course, but the emphasis was on youth. There were fun-filled games, contests, ample refreshments and gifts galore. And each afforded the youngsters an opportunity to "talk business" with Santa Claus.

Because Northrop people have long followed a custom of turning their thoughts to others less fortunate at this time of the year, much of the recent emphasis has centered around charitable activities.

Chances are, the final tabulations will show more than 100 families have benefited from the generosity of Northrop people. And there are hundreds of patients and wards in hospitals and institutions who will also share in this generosity.



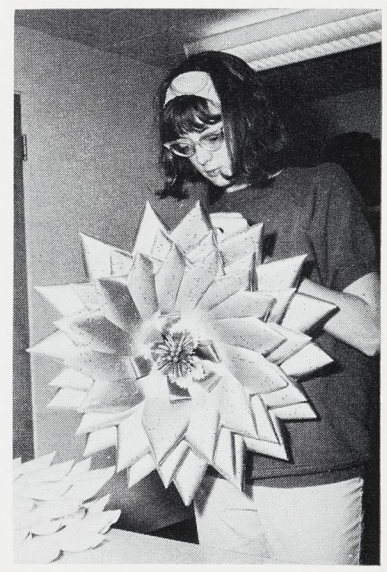
Northrop's Corporate office, Norair and Nortronics Divisions have long practiced the custom of "adopting" families for Christmas, sharing each individual member with gifts, food, clothing and other necessities. This practice begins internally with Northrop's needy handled first, then expands into communities and areas near Northrop facilities and even to far-off points where a need exists.

At Northrop Ventura the Dollar Donors, Inc., distributes gift certificates for food, clothing, gifts and necessities to known needy families within the division. It is a custom there to disperse a majority of funds retained for in-plant assistance at Christmas time.

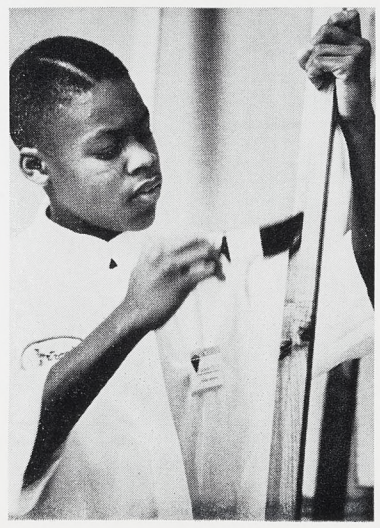
Northrop Architectural Systems has dispatched 950 pounds of foodstuff, along with a giant Christmas card signed by all 300 employees, to the U.S. Marines in Vietnam. Dale Albee, Personnel supervisor, reports each employee gave a maximum of $1 to cover costs. Delivery of the packages was arranged with the El Toro Marine Base. And NAS also provided gift baskets for employees away from work due to illness.

A few last minute reminders were being made this week as the holiday season approaches. Each employee can help by performing a safety inspection of his immediate area. Be sure all Christmas decorations are removed, shut off running machines, lock up all classified files, close windows and be sure everything is secured for the period ahead.

Northrop paymasters are distributing their special blend of Christmas cheer today and tomorrow.



Whether it's Christmas decorations or unusual gifts you're looking for, five Junior Achievement companies sponsored by the three Northrop divisions can deliver the goods. Below (from left) a young craftsman of Nortronics Hawthorne-sponsored Custom Craft firm paints wooden frame for serving tray; Mike DiDonato, president of Verse Kraft, sponsored by Northrop Norair, holds Christmas wreath; Counselor Leo Gross and members of Nortronics Anaheim-sponsored Trivco ready trivets for baking under heat lamp. At left, Terry Gilbert, president of Minico, sponsored by Norair, holds Christmas candle table decoration. At right, Kathy Mantle of Conaco, sponsored by Northrop Ventura, completes wreath. Above is a segment of of the Custom Craft production line working on serving tray.



MANUFACTURING

Wing Assemblers Collar 'Fastest Gun in the West'

Northrop Norair Wing Structures personnel now have their own candidate for the title of "fastest gun in the west."

It is geared more to speeding production, reducing costs and waste and eliminating a tedious operation than gunning desperados and protecting the old homestead.

But it is fast and a real gun—an automatic collar installation gun known affectionately and simply as "the gun."

Northrop Norair assemblers utilize "the gun" in installing about 60 percent of the more than 2000 3/16th-inch Hi-Lok fasteners found on the upper surfaces of both T-38 and F-5 wing assemblies.

Before "the gun" made its debut, this operation called for inserting Hi-Loks in countersunk holes and then shooting them with rivet guns to insure proper settings. Hi-Lok collars, all 2000 of them, were then inserted and screwed down by hand. Offset guns were then used for further tightening and to breakoff tips at a given torque. Total time: about four hours.

Now the first two steps in the old routine are taken and "the gun" takes over. It inserts the collars, tightens them and performs the breakoff all in one swift operation. It draws from an attached eight-foot plastic hose (with a capacity of 200 collars) required materials. Total time: about 30 minutes.

An automatic loading machine is a related item for reloading plastic hose reservoirs.

Perfection of this technique has been a joint venture between Norair's D. G. Reed, Wing Structures general foreman, G. T. Costa of Standard Tool Liaison and Jerry Bynum, sales engineer for Hi-Shear Corporation, manufacturers of "the gun."

Changes have been made to fit special requirements in prototype units. Now on order and expected momentarily are standard production units. Meanwhile, "the gun" or prototype unit is filling the bill.

"Naturally, our assemblers love this system," Mr. Reed said. "We find it cuts production time and costs, helps curtail waste and makes for a happier group of men."

Mr. Reed also feels this technique may be expanded into other areas and other uses. At present attention is being given to a collar gun for ¼-inch collars.

WITH A BANG, ZIP—D. L. Walton shows G. T. Costa (left) and Al Arthurs how fast automatic collar installation gun installs Hi-Lok collars on F-5 wing at Northrop Norair. Gun handles task in 30 minutes that once took four hours. Collars are drawn from silvery plastic tube with capacity of 200. About 2000 of these fastener units are found on each upper F-5 and T-38 wing.

Munsters Win '65 Football Crown

Manager Frank Warga's "Munsters" punched out a 20-12 victory over Manager Jim Owen's "Packers" December 11 to win the NRC flag football championship for 1965.

Carroll Hicks was named most valuable player for the "Munsters." Led by Captain John Massey, the team is composed of John Leffingwell, Larry Beuder, John Monson, Phil Fetchko, Stan Bunn, Carl Newman, Steve Perkins, Bill Howe, Don Akins, Bill Greene and Wayne Maples.

Tennis Team Being Formed for League

Tennis players from all Northrop divisions are being sought to man a Northrop entry in the West Los Angeles Industrial Tennis League opening play January 23.

This league, composed of top notch players from eight major industrial firms, will compete on alternate Sundays through May 15.

FOSTER CHILD

(Continued from page 5)

recognizes and appreciates the opportunities being offered him through the Norair group's support. Each letter mentions this fact with such phrases as "I am honored to be helped by you" and "though living far from you I always think of you and your great favor."

And perhaps the thoughts of this small boy, sent across the seas from a troubled world, best captures the true meaning of the season at hand. Bao wrote:

"On the occasion of the coming Christmas and New Year's I pray to God to bless all of you with happiness, longevity and the best of everything."

F-5 Most Effective Fighter, Filipino Pilots Claim

"None of us flying the airplane would trade it for another," said a Philippine Air Force pilot, who had just set down in an F-5 at Williams Air Force Base, Arizona, last summer.

"The F-5 is the most effective tactical fighter plane in use in the world today," he added.

Today, that pilot, who received training in the F-5 at Williams through the U.S. Military Assistance Program (MAP) is training other members of the PAF 5th Fighter Wing, and the wing has nine brand new F-5's of its own.

Delivery ceremonies October 25 saw Diosdado Macapagal, then president of the Philippines, accept the F-5's on behalf of the Philippine government from U.S. Ambassador William McCormick Blair, jr.

Northrop was represented at the ceremony by Senior Vice President Robert Miller and Milt Kuska, Dan Darnell, Bill Wier and Dick Allen of Norair.

Air Force officers of both nations attending were Major General Victor H. Dizon, PAF commander, Brigadier General Joe Ramos, PAF vice commander, Brigadier General James R. Winn of the U.S. Military Assistance Group, and Colonel William Lawley, USAF air attache.

Colonel Emmanuel Casabar, commander of the 5th Fighter Wing, is one of the most enthusiastic supporters of the F-5 and was one of the first PAF pilots to successfully complete the training courses at Basa Air Base, Pampanga, home of the Wing.

Major Angel Okol who, along with five other PAF pilots, spent five months at Williams AFB, is supervisor of the pilot and maintenance program at Basa Air Base. Major Okol was named outstanding member of his class at Williams.

More than 50 PAF maintenance personnel also were trained at Williams. They are now in-

(See PHILIPPINES, page 8)

F-5 Reliability Proven With Pioneer Effort

Northrop Corporation has successfully completed a formal reliability demonstration program for the F-5 tactical fighter.

This accomplishment follows an earlier, and equally successful, demonstration performed on the T-38 trainer.

Mr. Harter

Northrop is one of the first major Air Force contractors to contractually commit to and demonstrate aircraft reliability, and the first to have accomplished this on two airplane programs.

In both T-38 and F-5 demonstrations Northrop has met or exceeded all established reliability requirements and goals.

"This is an enviable record and an accomplishment in which each Northrop Norair employee involved shares with equal distinction," said W. W. Harter, Norair chief of Reliability.

In addition to the obvious successes attained, Northrop has additional right to be proud, since it played a pioneering role in the formulation and application of a formalized reliability program for an airplane development and production program.

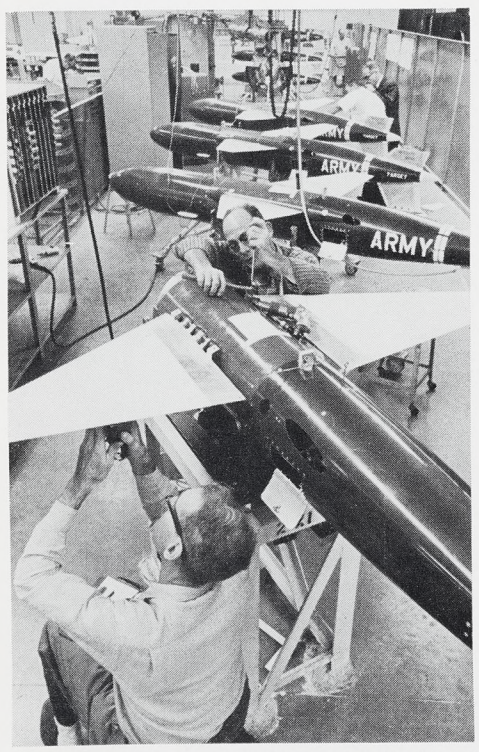
Techniques for reliability prediction, measurement and demonstration had to be developed. Northrop was the first to use Air Force maintenance data for reliability monitoring. The success of the T-38 reliability program has received national attention.

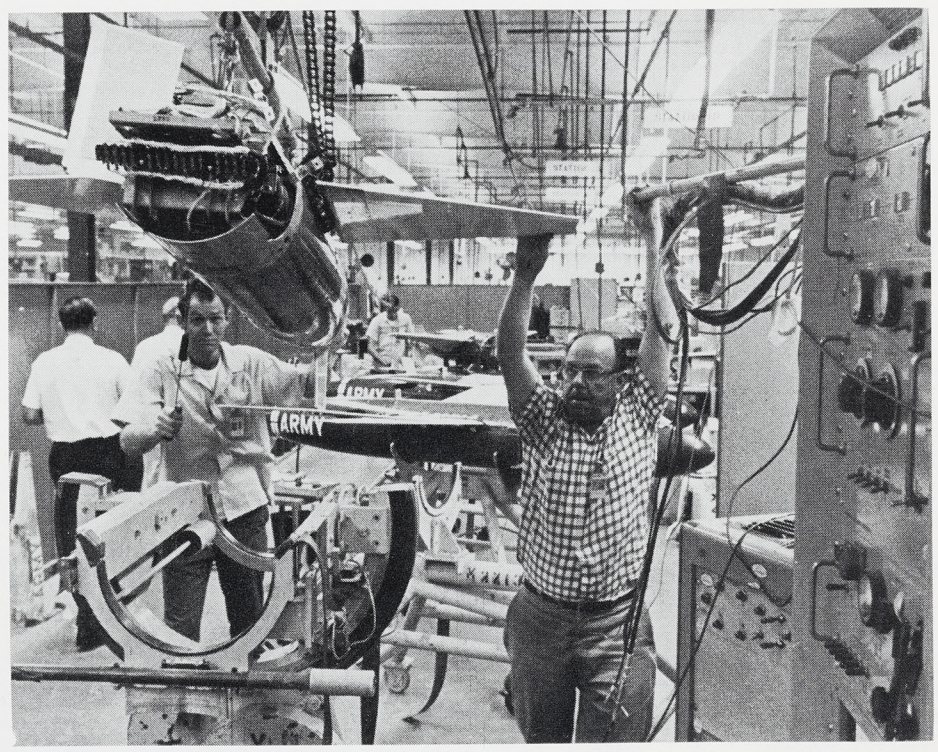
Fred H. Behrens, chief, Operations office, directorate of Avionics of the Air Force Systems Command, said of the program:

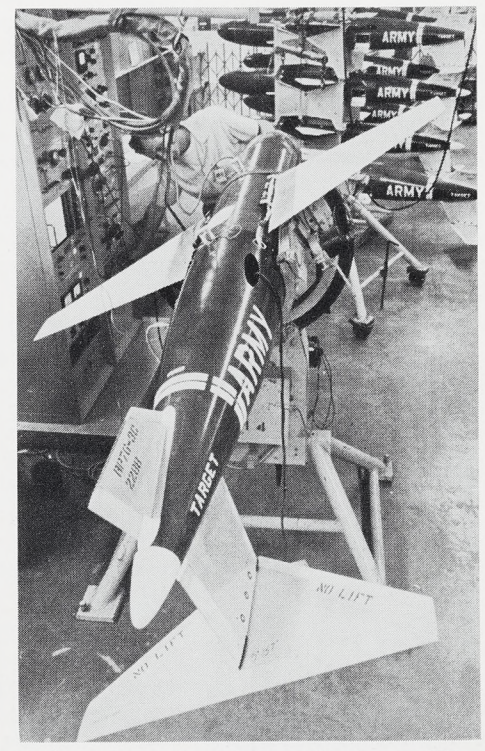
"The reliability and failure data reporting program established for the T-38 program was the first to provide an accurate system of reporting GFAE failures. The reports from the T-38 program have received considerable attention and have stimulated numerous surveys in an effort to understand, define and establish

(See RELIABILITY, page 8)

AQM-38A IS QUEEN OF DRONE LINE







Assembly of AQM-38A (RP-76) drones at Northrop Ventura requires careful attention to torque settings of eccentrics which provide proper dihedral for wings. After that, permanent wing bolts are installed. In left photo, detail assemblers Mike Reichert, left, and John Baker adjust wing position. In second photo, Neil E. Ward, test technician, left, and Leon Barnes, detail assembler, lower target drone into test fixture for complete preflight electrical checkout. Last photo shows Mr. Ward performing the operational test of such electrical equipment as receivers, transmitters, gyros and antennas. This particular bird contains destruct system, which was also electrically tested, although a parachute recovery system is included in many of the AQM-38As built at Ventura. Final assembly of the drone, produced under a current Army contract, will continue through January.

Sutter to Direct Expanding Activity Of Page Marketing

Walter E. Sutter has been elected vice president and senior director of Marketing at Page Communications Engineers. The announcement was made by Joseph A. Waldschmitt, Page president, who indicated the Northrop subsidiary is expanding its marketing organization further in the commercial and international areas after years of successful systems management for the U.S. Department of Defense.

Mr. Sutter served in his previous association with the General Electric Company in the fields of communications and computers as manager, Telecommunication Sales and Service, Communication Products department; manager, Product and Systems Sales, Communication Products department; and, most recently, manager, Defense Sales, Computer department.

LSV Study Updated By Sponsler Paper

William B. Sponsler, member of the technical staff at Northrop Space Laboratories, will present a paper on preliminary mobility tests of a scale model lunar roving vehicle January 14 at the 1966 Automotive Engineering Congress and Exposition in Detroit.

Mr. Sponsler is inventor of the system — described as "walking beam suspension" — for Northrop's lunar surface vehicle.

United Crusade Presents Awards

United Crusade's Outstanding Service Award has been presented a team of volunteers, including 10 from Northrop, that has done an outstanding job in raising funds for the annual charity drive.

The team comprises the Commerce and Industry Division in the Southwest Area, the first group to exceed its goal in the area.

Welko Gasich, Norair vice president and assistant general manager-Technical is the vice chairman. Team members include Fred Anderson, Hank Clark, Charlie Eyres, John Fisher, Clay Fullenwider, Gordie Gmur, Ralph Jenney, Don Kohler and Bill Steen of Norair.

Also recognized for outstanding service was Norair's Marvin "Red" Beyrodt, a United Crusade loan executive, who accounted for 60 percent of total funds pledged in the area for this division.

Harold Page, liaison engineer, holds check for $515 he has just received from Welko Gasich, Norair vice president and assistant general manager-Technical.

ENGINEER POCKETS $515; NEW TREND IN AWARDS SEEN

Harold W. Page, a Northrop Norair liaison engineer, has pocketed a check for $515 from the Norair Suggestion Award Plan.

His award is one of the largest presented this year and ranks as tops among Engineering personnel for the past few years. However, Suggestion Award administrators report a growing number of suggestions are being processed each week from Technical personnel, marking the beginning of what could be a new trend, and that Mr. Page's top spot may be in jeopardy.

Mr. Page came up with an improved method for repairing slightly damaged F-5 and T-38 windshield and canopy glass.

Previously, damaged canopy assemblies were removed at Palmdale and returned to the factory, via Mariposa. Glass was removed and shipped to the vendor for repairs. Disregarding elapsed time, this method involved 29 steps and consumed about 19 manhours for handling, packaging, routing, repairs and tests. The cost ran to about $350 per item.

Mr. Page suggested a qualified technician be sent from the vendor's establishment to make repairs at Palmdale. In the first six months of 1965 the vendor made five trips at an average cost of $125 per trip and reworked 12 damaged glasses.

The annual savings (net) from Mr. Page's suggestion is expected to be around $5147.

Welko Gasich, Northrop vice president and assistant general manager—Technical, presented the Suggestion Award check to Mr. Page and added his personal thanks for his thinking, ingenuity and support.

Busy Schedules Mapped for Lifting Body Research Vehicles Produced for NASA

Busy schedules are being mapped for the two lifting body research vehicles, the M2-F2 and HL-10, produced by Northrop Norair for the National Aeronautics and Space Administration (NASA).

Initial manned captive flight of the M2-F2 is now pending at NASA's Flight Research Center, Edwards, California.

And at Northrop Norair the HL-10 is moving through final stages of assembly in preparation for a mid-January delivery date.

Both vehicles will be utilized by NASA in studies that could lead to the next big step forward in the art of returning manned vehicles from space. These wingless, wedge-shaped vehicles promise a major advantage over reentry vehicles currently in use in manned space projects—they are capable of gliding to controlled landings at a selected site.

NASA's Office of Advanced Research and Technology has primary responsibility for the lifting body research vehicle program. Ames and Langley Research Centers established basic configurations for the M2-F2 and HL-10 respectively, while Flight Research Center is coordinating the over-all program. Paul Bikle is Flight Research Center director with John McTigue serving as M2-F2/HL-10 program manager.

Northrop's efforts are guided by Manager Dr. L. R. Fowell; R. C. Hakes, director; L. W. Klauer, Engineering chief; and R. H. Thornhill, Manufacturing chief.

Northrop Norair delivered the M2-F2 to NASA in June. It was trucked to the Flight Research Center for final instrumentation then sent to Ames Research Center for a full-scale 100-hour wind tunnel test program to verify aerodynamic characteristics.

Since early September the M2-F2 has moved steadily toward its first manned captive flight test at Flight Research Center.

Minor changes, crew familiarization, systems checkout and calibration efforts have been carried out. A major activity has been the mating of the M2-F2, via an adaptor produced by Norair for the program, to the pylon assembly below the wing of a B-52 mother ship. Recently, a series of high-speed taxi and low altitude flight tests were conducted with the M2-F2 in place aboard the B-52.

Solo taxi runs were carried out on the M2-F2 December 7. Two runs were made with Milton Thompson, chief program pilot for NASA, and Captain Jerauld Gentry, USAF, alternating at the controls.

The M2-F2's two regular hydrogen peroxide rocket engines, used to provide an increased lift/drag ratio during critical approach and flare, were augmented by the installation of two additional engines of the same type. Total thrust, controlled by throttles, was 2000 pounds for this test operation.

Mr. Thompson will be in the cockpit when the M2-F2 makes its first captive flight test aboard the B-52. Plans call for a climb to about 45,000 feet. Of special interest will be the dynamics of the vehicle-adaptor-pylon combination in flight, buffeting incurred and in-flight operation of all controls and landing gear.

Flight test schedules at Edwards Air Force Base are very much dependent on weather. The "dry" lake bed has recently been more suitable for water skiing.

Meanwhile, the HL-10 is in the midst of systems installation and final assembly operations. It was removed from its assembly fixture in late October. Included in the extensive test program planned prior to delivery in January is a drop test of the vehicle, loaded to 8000 pounds gross weight.

This test effort, to be carried out in the Engineering Test Laboratories, will find the HL-10 simulating a landing vertical velocity of 13 feet per second. Thorough structural inspection and functional systems checkout will follow.

The route the HL-10 will follow toward its first flight will parallel that of the M2-F2. It will go to Flight Research Center, **(See LIFTING BODIES, page 8)**

MEETINGS

TEAMS, Super Sensor Discussed at MAECON

The DATICO/TEAMS concept of automatic test equipment and an electronic sensor that surpasses the state-of-the-art were described by two Northrop Nortronics engineers last month at the Mid America Electronics Conference (MAECON) in Kansas City, Missouri.

Donald R. Behrens and Robert L. Werth of Automation Systems section at Anaheim presented the papers.

The TEAMS (Test Evaluation and Monitor System) concept, newest in the eight-year history of DATICO applications, was created to provide an integrated organized approach to the performance monitoring of multiple systems at minimum total costs, Mr. Behrens said.

Total costs are minimized by simplification of procedures, formats, equipment design, programming, and documentation.

Most significant in the TEAMS concept, however, Mr. Behrens said, is the development of a general test procedure and a general test format which can be repeated on all tests of all systems through standardization.

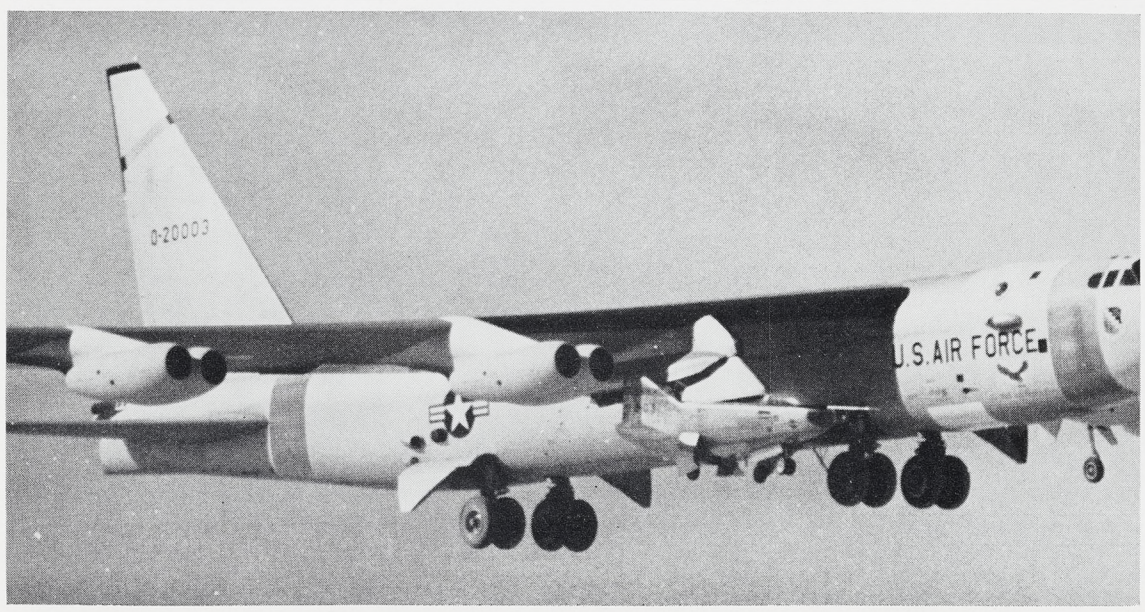
In describing the gap which the latest developments in Nortronics automatic test equipment fills, Mr. Behrens said "the growth of electronic systems in numbers and complexity without comparable growth in standardization of test methods and their mechanization has created a severe performance evaluation and maintenance problem for the user."

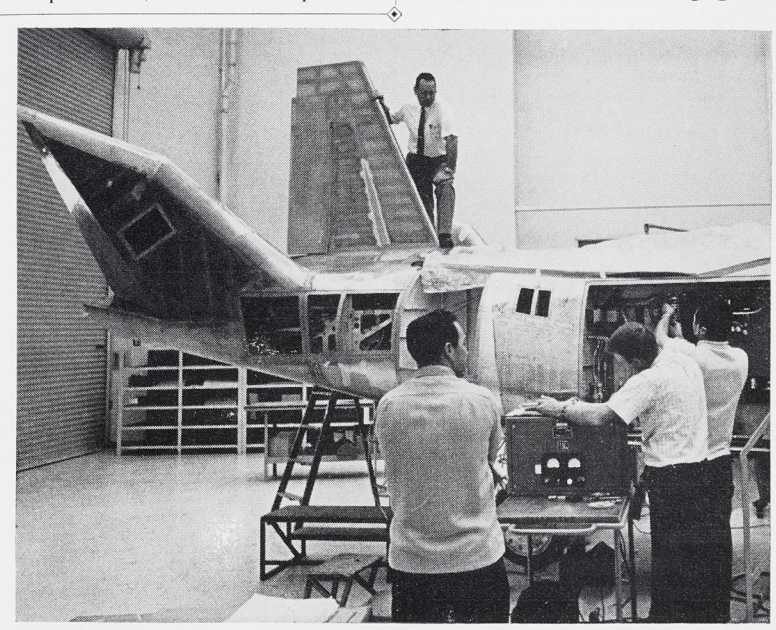
Mr. Werth, developer of an automatic pulse analyzer, told the MAECON conference that the instrument uses state-of-the-art components and circuit design to extend the existing ranges of pulse (waveform) measurement.

"Automatic testing of missiles, packages, and subsystems has resulted in an urgent need for a programmable measurement instrument to evaluate dynamic waveform parameters," he said. "Most systems have achieved high measurement accuracy in the areas of voltage and frequency but the scarcity of programmable dynamic measurement equipment led to the development of a pulse analyzer."

The instrument surpasses the oscilloscope in accuracy and reliability while reducing the measurement time from minutes to milliseconds.

The use of the pulse analyzer, either in the field of missile and weapon system checkout or on the manufacturing line, will reduce test time by a factor of 1000 while giving test results that are free from operator interpretation, Mr. Werth explained.





B-52 TAKES OFF FROM EDWARDS AIR FORCE BASE WITH M2-F2 LIFTING BODY RESEARCH VEHICLE UNDER ITS WING, WHILE FINAL CHECKOUT OF HL-10 IS UNDER WAY AT HAWTHORNE.

Classified

For Sale

Bedroom Set, modern, bookcase headboard, 2 night stands, triple-dresser w/mirror, chest, dbl. bed, $65. Inglewood, OR 3-1189. A

Professional Printing Press, hand-operated, postcard size, complete w/several sets of type in special cabinet, suitable for ambitious youngster or for professional use, $125. Inglewood, PL 6-7681. A

Ice Skates, boy's size 3, CCM figure-type, $20. No. Corona, 735-1232. A

Corvair, Monza coupe, 1962, $1095. Hawthorne, 675-0549. A

Myna Bird & cage, very tame, large vocabulary, $75. Hawthorne, 371-5822. A

Exerciser, electric upright, $15. Hawthorne, OS 6-3886. A

Furnishings, coffee tables, several, from $7-$25. L.A., 476-1635. A

House, 4-bdrm, family room, 2½ baths, 1 acre, horses OK, near Northrop Ventura, $35,000. Somis, 805—482-1186. A

VW sunroof, 1963, windshield washers, heater, $1200. Long Bch., 596-1280. A

Camera, Tower 35mm auto., built in flash, F3.8 lens, $15. Hawthorne, 676-6122. A

Accordion, 120-bass, $75. Downey, TO 9-2673.

Camera, 3¼ x 4¼ Speed Graphic press w/ Polaroid back, $75. Orange, 714—KE 2-1232.

Power Lawnmower, 20″ Trimmer, reel-type, Briggs & Stratton eng., full span reel, front catcher, $75. Rolling Hills, 831-9707. A

DKW, 4-dr., $55. Brea, 529-3531. A

Pole Planter, 9-plant, $15. Brea, 714—529-1436. A

Shotgun, Browning, over & under, semi trap gun, full & modified choke, 12 ga., $250. Buena Pk., LA 1-4711. A

Go-Kart, original, foam rubber/black vinyl seat, 2½ hp Clinton eng., chain drive, $125. Hawthorne, OS 5-9500. A

Car Radio for 1949-1950 Chevrolet, $10. Lawndale, 371-0194. A

Winchester, model 70, caliber 220 Swift, w/ 8-power scope, $150. Hawthorne, OS 9-7123.

VW Variant station wagon, 1965, 1500 series, belts, radio, vents, w/s/w, 10,000 miles, $2300. Hollywood, OL 6-3475. A

Stereo hi-fi components, AM/FM tuner, dual amplifiers, dual preamps, 4 speakers, dual cross-overs, stereo turntable, $66. Hawthorne, 676-0418. A

Pups, basset, AKC reg., shots, whelped, $75. Tarzana, 344-3644. A

Organ, Baldwin model 40 Orga-Sonic w/percussion, Philippine mahogany w/matching bench, 2 keyboards, 2 octaves of base pedals, $695. Redondo Bch., FR 5-3914. A

Ford, 1957, 6-cyl., auto trans., $250. Box 2201. A

Range, elec., Westinghouse, coppertone, 4-burner, auto. oven & timer, $175. Gardena, 324-0274. A

Outboard Motor, Johnson, 1953 10 hp, 5 gal. fuel tank, complete o/haul, $85. Hawthorne, 675-2953. A

Duo Bed, 2 cot-type beds in compact unit, 2 innerspring mattresses, $25. San Pedro, TE 3-6814. A

Cabin Cruiser, 27′ Chriscraft sedan, sleeps 4, planked hull, V-8 power, ship to shore radio, completely equipped, $5500. Torrance, DA 9-3900. A

MG TD, 1953 classic, $650. Lomita, 325-1407.

Refrigerator, Philco, 12 cu. ft., large freezer, defrost, $100. Hawthorne, OS 9-2875, 370-2125. A

Glasspar custom sunliner, 1964, 18′ LOA, 120 hp Mercruiser, access., American trailer, $2995. Palmdale, TO 2-8014. A

Surfboard, Bing, 9′4″, $85. Lynwood, 632-2642. A

TV, 24″ RCA, modern birch cabinet, new picture tube, w/complete set of spare tubes, $100. Lomita, DA 6-6214. A

Corvair, 1961, Lakewood station wagon, auto. trans., r/h, $795. Venice, EX 1-2040. A

Motor Scooter, Cushman, new tires, body needs work, $65. Garden Grove, LE 9-5812. A

MGA, 1958, new paint & top, wire wheels, $600. Inglewood, PL 8-9825. A

Phonograph, 1966 model, AM/FM stereo, $125. Box 2202. A

Cemetery Lots, dble. interment, Inglewood Park, El Portal sec., $800 lot. P.V. Pen., 377-1180. A

Bedroom Chests, 3 white contemp., 5-drwr., 3-piece corner sectional w/3-drwrs. each, gold and white legs, $200. Inglewood, 677-7608. A

Piano, Hallet & Davis spinet, mahogany, $350. Torrance, DA 6-7232. A

Dodge, 1964, 4-spd., G.T., $1750. Lakewood, 422-3368. A

Pickup, 1956 Ford custom cab, ½-ton, w/ 1959 rebuilt eng., Fordamatic trans., new paint, good tires, $650. Lynwood, 631-3459. A

Plymouth, Plaza, 1957, 2-dr. sedan, 6-cyl., stick shift, 45,000 miles, r/h, $250. L.A., 752-5687. A

For Sale

Bicycle, boy's Schwinn Stingray, $30. Torrance, FA 8-2852. A

Stove, O'Keefe & Merritt, 35″, $50. Gardena, 327-2279. A

Refrigerator, Servel, $40. Hermosa Bch., FR 9-7342. A

TR 3 Triumph, 1962, r/h, $850. Torrance, 326-2296. A

Motor Scooter, 1962, Zundapp Bella, 12 hp eng., less than 1200 orig. miles, $275. Hawthorne, OS 5-6831. A

Surfboard, Jacobs, 9′3″, 3 redwood stripes, $50. Torrance, 375-9657. A

Corvair Monza coupe, 1961, bucket seats, seat belts, 4-spd. trans., w/s/w, r/h, $850. Inglewood, 678-5846. A

Mercury Montclair, 1955, 4-dr. r/h, w/s/w tires, 57,000 miles, 1-owner, $200. Inglewood, 671-4986. A

Camera, Canonette 35 mm. auto. or manual, F1.9 lens, 1 sec. to 1/500 w/case & filter, $55. L.A., EX 7-2872. A

Kittens, Siamese, seal points, 8-wks-old, no papers, $15. Anaheim, 776-8785. A

Yamaha, 1964, 80 c.c., $225. Torrance, 328-7870. A

Ford, 1940, V-8 deluxe coupe, needs paint & upholstering, $150. Inglewood, PL 6-1812. A

Camping Trailer, 1963 model, 12′, sleeps 4, complete w/stove & oven, $750. L.A., 757-3595. A

Chevelle, 1965, 2-dr. station wagon, used 4 months, $3000. Hawthorne, OS 6-7542. A

Organ, Thomas electronic transistorized, ebony, matching bench, 2 keyboards, 25′ pedals, Leslie speakers plus 3-12″ speakers, fluorescent music rack light, chimes, percussion, many extras, 3 yrs. guaranty on the tone generators, $1300. Hawthorne, 679-4365.

Organ, Hammond, spinet w/extras, $850. Gardena, DA 4-3666. A

Typewriter, 1957 Smith-Corona standard, rebuilt, legal-size carriage, magic margins & tabs, $65. L.A., 293-7922. A

Mobile Home, 12′x60′, 2-bdrm., furn., or unfurn., antique white int., white & gold ext., 50′ awning, carport, skirts & shed, $1800 equity & take over $92.50 mo. payments or $6000. Torrance, 370-4101. A

VW 1200 sedan, 1965, many extras, 8000 miles, $1650. L.A., 474-9790. A

Communications Receiver, Collins 75S-3, new condition w/full crystals, $425. El Segundo, 322-6655. A

Train, Lionel, elec., $12. Torrance, FR 9-5690.

Drafting Machine, Bruning, 18″ metal & 10″ plastic scales, $90. San Pedro, TE 3-9696. A

Chevrolet Impala, 1963, SS coupe, air cond., p/s, 39,000 miles, orig. owner, $1850. L.A., 876-8395. A

Home, 3-bdrm., view, built-ins, fireplace, sprinklers, 1½ bath, 5-yrs-old, newly redec., $24,500. FR 6-6364. A

Stamps, 1 book of 1st covers, (first day of issue), 2 books of stamps comp. w/foreign & world wide, $75. Rolling Hills Ests., AD 4-2878. A

VW Variant 1500S, 1965, sq. back sedan, wagon, 5000 miles, $2275. Inglewood, OR 1-8694. A

International Travelall C110, 1963, 304 V-8, 5-spd., h-d trans., air cond., r/h, powerloc, tach., easy lift hitch, extra 6-ply tires, 21,000 miles, $2295. P. V., 377-1075. A

Train Set, American Flyer, elec., incls. engine, tender & 3 cars, transformer & track, $10. Fullerton, 526-4275. A

Chevrolet station wagon, 1957, auto. trans., r/h, p/b, p/s, w/s/w, air cond., $550. Torrance 323-2074. A

Bicycle, Stingray, still in packing crate, $31.50. Gardena, DA 4-4507. A

Organ, Thomas electronic, single keyboard, bass pedals, voice controls, $175. Fullerton, LA 6-2071. A

Chevrolet, 1953 convt., stick shift, good top, tires, brakes, $195. Torrance, 327-4585. A

Coat w/belt, pink naugahyde, size 14, $25. Hawthorne, OS 6-7082. A

Ford station wagon, 1955, 6-pass., r/h, $100. Hawthorne, 644-3162. A

Bicycle, boy's 24″, $15. Manhattan Bch., FR 5-5097. A

Washer, Kenmore DeLux auto., w/dryer, Wedgewood, gas, $85 or separately. Rolling Hills, FR 5-5036. A

Clothing, boy's, sizes 10-16, suits, jackets, coats, shirts, $50. Chatsworth, 882-0761. A

Mobile Home, Roadcraft, 50′, 8′x35′ cabana, steel storage room, awnings, carport, $4000. Gardena, 329-5879. A

Wire Wheels, 2 19″, suitable for MG PA, MG J2, MG TC, $10 ea. Torrance, 375-0449. A

Ford coupe, 1948, 1963 Chevrolet 283 eng., new black tuck & roll, completely restored, vibrasonic radio & many extras, Torrance, FR 8-1350. A

Ford, 1956, 2-dr. Victoria, T-Bird V-8 eng., auto. trans., $295. San Pedro, TE 1-2654. A

House, 2-bdrm., fireplace, double garage, $21,750. Inglewood, OR 1-3860. A

Typewriter, Smith Corona, portable, 3-yr-old, $35. P.V., 377-8259. A

For Sale

Bed, twin-size, w/collapsible trundle bed & mattress, $75. Torrance, DA 4-7601. A

House, 4-bdrm, built-ins, near new, $36,500. Torrance, 327-2666. A

Chevrolet, 1957, mag. astro rims & Casler cheaters slicks, bucket seats, new trans. & front end, $750. Torrance, 378-5924. A

Trampoline, 6′x10′ folding-type, $65. Inglewood, 757-6960. A

Ford, 1959 station wagon, r/h, good tires, runs good, $425. Box 2203. A

Austin, 1959, Cambrian model, 4-dr. sedan, bucket seats, 4-spd., low miles, $350. Gardena, 327-0662. A

House, 2-bdrm, custom inside, panelled kitchenette, covered patio, 2-car gar., 15′x35′ filtered & heated pool, Alcoa aluminum siding, cor. lot, $23,500. Lakewood, HA 5-6844.

Wet Suit, hvy. duty, hood, top, bottom, 40-42, fins, flipper slippers, mask w/exhal. valve, $50. Torrance, 323-4257. A

VW 1500 S, 1964, sedan, 66 hp, $1850. Lynwood, 638-4954. A

Buick Le Sabre, 1963, 4-dr. h/top, factory air, auto. trans., p/s, p/b, r/h, $1895. P.V., 378-9741. A

VD sedan, 1963, 23,000 miles, $1300. Box 2204. A

Desk, black walnut finish, exec. style, $45. Box 2205. A

Land, 10 acres near Rosamond, $595 acre w/ terms, Torrance, FR 8-1026. A

Engagement Ring, exceeding ½ karat blue-white diamond w/matching wedding band, $175. El Segundo, OW 1-0134. A

Pontiac Bonneville sta. wag., 1960, auto. trans., p/s, p/b, p/seats, p/windows, 48,000 miles, new tires & brakes, $1100. Orange, 714-633-4378. A

Ford, 1958, 4-dr., new battery, smog device inst., $250. Torrance, 371-8564. A

TV, combination, 21″, radio & record player, red mahogany cabinet, new picture tube, $100. Rolling Hills Ests., DA 5-5609. A

Train Set, 3 eng., 11 cars, 2 mechanized, 125 watt transformer, 3 bldgs., 1 tunnel, other misc. accessories, $65. Long Bch., GA 3-1363. A

Tires, 4 6.70 x 15 b/w, $40. Torrance, 323-1936. A

Surfboard, 9′6″ Jacobs, yellow pigment deck, $45. Rolling Hills, FR 7-3552. A

House, 2-bdrm., on R-2 lot, h/wood floors, interior recently painted, patio w/built-in barbeque, consider lease w/option to buy, $16,000. Torrance, FR 1-0629. A

Stereo-Pak, Muntz, 12 volt car., 3 tapes, 3-mos.-old, chrome ext., $50. No. Hollywood, 764-7131. A

Chevrolet, 1958, 3-spd. trans., chrome rear wheels, r/h, ¾ racing cams, new shocks, tires, front end rebuilt, $800. Torrance, 328-6277. A

Television, Packard Bell, 17″ screen, blonde console, $50. Torrance, DA 3-8797. A

Refrigerator, Coldspot, 12 cu. ft. freezer across top, $75. Gardena, 644-1485. A

Corvette, 1958, 3-spd. trans., new tires, $1200. Torrance, 329-7446. A

Mercury Comet, 1965, 2-dr. sports, 2200 miles, p/s, p/b, bucket seats, air cond., $2600. Inglewood, 674-5579. A

Hi-Fi Console, Packard-Bell, 4-spd. record changer, AM/FM radio, 3 speakers, mahogany cabinet, $50. Hawthorne, 676-2801. A

VW sedan, 1965, 9300 mi., $1575. Redondo Bch., 372-7390. A

Trundle Bed set, cot-size, innersprings, $15. Costa Mesa, 549-1760. A

Thunderbird, 1960, h/top, new paint, tires & battery, full power inc. seat, $945. Box 2206.

Wanted to Buy

Bicycle, good used 10-spd. Derailleur. Hawthorne, 676-5464. B

Encyclopedia, World Book, complete. L.A., 472-2031. B

For Trade

Tire, 525-550x17, trade for 750x14, white wall. L.A., AX 2-4958. C

Pontiac Tempest, 1965, 2-dr. sport coupe, 250 hp eng., p/s, radio, trade for smaller car. P.V. Pen., 377-5172. C

Luggage Carrier, Sears cartop model, 72x48x 14, waterproof plastic-fabric, full length zipper access, will trade for carrier of smaller size. Hawthorne, 675-9557. C

FREE (To Be Given Away)

Pup, 11-wks.-old, mixed breed. L.A., VE 7-9813. D

Rentals Offered

Studio Apt, 3-bdrm, 2-bath, pvt. patio, closed gar., soundproofed, hot water & trash pd., near schools, park & bus line, $175 mo., Torrance, FR 5-0867. E

Apt, 3-bdrm., $130 mo. Gardena, 324-6277. E

Apt, 1 & 2 bdrm., furn. & unfurn., soundproofed, all electric, closed gar., some w/ small fenced yard, 10 minutes to Nortronics PV, close to schools, churches, playground, $75-145. Torrance, 375-9397, 375-2091. E

Rentals Offered

House, furn., 2-bdrm., double garage, $125 mo. Gardena, DA 4-7688. E

Bachelor Apt, 1-bdrm., furn., fireplace, garage, utilities, 3 min. from ocean, $110 mo. Hermosa Bch., 372-5985. E

Engineer has furn. 2-bdrm. apt. to share, convenient to Norair, occupancy around mid-Dec., $100 mo. & utilities. Inglewood, 674-1634. E

Apt, 2-bdrm, redecorated, pool, child OK, W. L.A. area, $125. L.A., VE 7-4036. E

Cabin, Idyllwild, sleeps up to 6, fireplace, stream, patio, $20 weekend, $50 wk. Inglewood, PL 4-5288. E

Apt, 1-bdrm, unfurn., ½ block to ocean, garage, $90 mo. Redondo Bch., FR 5-8938. E

Apt, 2 2-bdrm units, upper & lower, & bachelor unit, built-ins & stoves, 2 blks. to Norair, $110 & $95 mo. Hawthorne, OS 6-7417. E

Apt, 1-bdrm, upstairs, built-in stove, laundry facilities, $89. Gardena, 328-6955. E

House, 1-bdrm., small, furn., lge. encl. yard, tiled shower, $90 mo. Inglewood, OR 2-5852, OR 1-2097. A

Apt., 3-bdrm., furn. or unfurn., gar. avail., children OK, $115-$135 mo. San Pedro, TE 1-3737. E

House, 1-bdrm., unfurn., h/wood floors, 220-v elec., 3 miles from Northrop, $65 mo. Hawthorne, 676-5565. E

Personals

Tap Dancing lessons for children, private or class. Gardena, 675-1005. L

Rider wanted to share driving to Boston, Massachusetts. Leaving about January 8. San Pedro, 831-6462. L

Share home w/single woman or working mother. 3-bdrm., 2-bath, lge. fenced yard, fireplace, near parks & school, 5 minutes from Norair. Gardena, 323-3245. L

We appreciate so very much the kindness & understanding shown by our many friends at Northrop in the recent sad weeks. JERRY SMITH & FAMILY.

For Sale or Trade

Couch & chair, studio-type, $25 or trade for 2 occasional chairs in good condition. Hawthorne, 644-2440. M

Multiple Renault parts, $50 or trade for 10-spd. near new bicycle. Torrance, DA 6-5558.

Condominium Apt, 4-bdrm, 2½ bath, 2-car det. garage, pool, clubhouse, 1-yr-old, $30,500, 10% dn., will trade for Hollypark home. Torrance, 327-3160. M

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Main St. & 234th, Wilmington. Maie Robinson, Norair, ext. 2004, TE 4-8352. 2

8 a.m. — 4:45 p.m.

Orange Ave. & Del Amo, Long Beach. W. T. Covert, NSL, ext. 2721, GA 3-1363. 5

Rides Offered

8 a.m. — 4:45 p.m.

Orange Ave. & Del Amo, Long Beach. W. T. Covert, NSL, ext. 2721, GA 3-1363. 15

PHILIPPINES

(Continued from Page 6)

structors in the F-5 maintenance school at Basa.

Charles T. "Chuck" Weaver is the Northrop Field Service technical representative assigned at Basa Air Base to provide technical advice and assistance to the PAF on operation and maintenance of the F-5s.

RELIABILITY

(Continued from Page 6)

corrective programs for both the equipment involved and the reporting procedure."

Basic concepts of the program were introduced in early 1959 and carried out during developmental testing and later customer testing of the T-38, primarily at Randolph AFB, Texas.

The F-5 reliability demonstration recently concluded was carried out during actual combat crew training missions being flown at Williams AFB, Arizona.

In the most simple terms, the F-5 program called for Northrop to contractually commit to the meeting of exacting reliability goals and requirements, and to the development and implementation of a management plan for assuring the achievement of these requirements.

The reliability program plan identified management responsibilities for reliability goals and requirements. Management control was afforded by periodic status reports. These included reliability predictions, measurements from tests, status of reliability attainment tasks, current reliability problems, failure corrective action, and a comparison of indicated reliability with established goals.

For the F-5 fighter the reliability index established for measurement was mission reliability. It is the probability of a two-hour composite tactical mission being carried out without failures. A failure is anything that would prevent accomplishment of any objective of the mission—a leaking landing gear strut and failure to fire 90 percent of gun rounds carried. A mission begins with the arrival of the aircrew and ends with engine shutdown following flight.

A special monitoring team, composed of representatives of Tactical Air Command, Northrop Norair and General Electric, checked and double-checked every factor involved.

LIFTING BODIES

(Continued from Page 7)

then to Ames Research Center for a 100-hour wind tunnel test program. Upon return to Flight Research Center, it will undergo similar preparations for flight.

In addition, Northrop is supporting NASA efforts, as needed, by supplying technicians and special personnel under a separate contract. Ralph Allen is currently on duty at Flight Research Center as a Northrop technical representative. Other personnel are sent there as required and requested.

PERFECT PERFORMANCE PROGRESS—The 24 members of the Product Support department Technical Art branch pose proudly with their Zero Defects Perfect Performance chart. Through their enthusiastic support of the ZD effort, this group has achieved their initially established goal a full five months ahead of schedule.

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